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In the Supreme Court
OF THE
United States

OCTOBER TERM, 1928

No. 528

4

CONCRETE MIXING & CONVEYING COMPANY
(a corporation),
Petitioner,

vs.

R. C. STORRIE & COMPANY
(a partnership),
Respondents.

BRIEF ON BEHALF OF R. C. STORRIE & COMPANY, DEFENDANTS-RESPONDENTS.

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In the Supreme Court
OF THE
United States

OCTOBER TERM, 1928

No. 528

CONCRETE MIXING & CONVEYING COMPANY
(a corporation),
Petitioner,

vs.

R. C. STORRIE & COMPANY
(a partnership),
Respondent.

BRIEF ON BEHALF OF R. C. STORRIE & COMPANY, DEFENDANT-RESPONDENT.

(For the convenience of the Court a list of plaintiff-petitioner's and defendant-respondent's exhibits appears in the index; page reference to the printed record being designated by "R." The petitioner will be called plaintiff and the respondent-appellee, the defendant. All boldfaced type or italics wherever occurring herein unless otherwise specified are ours.)

STATEMENT.

Plaintiff brought suit in the Western District of Washington, charging infringement of McMichael

Patent Number 1,127,660, issued February 9, 1915 on an application filed January 14, 1907, relating to the conveying of concrete by means of compressed air.

The charge of infringement against defendant was predicated on their use as contractors for the City of Seattle on the so-called Skagit River project, of a Hackley pneumatic concrete conveying machine or "concrete gun," built under the Hackley patent Number 1,619,297, dated March 1, 1927.* (Defendant's Exhibit 187, R. 78 of Exhibit Book.)

The two devices (plaintiff's and defendant's) are quite different from one another. They are not only different in construction and appearance but are radically different in principle and mode of operation.

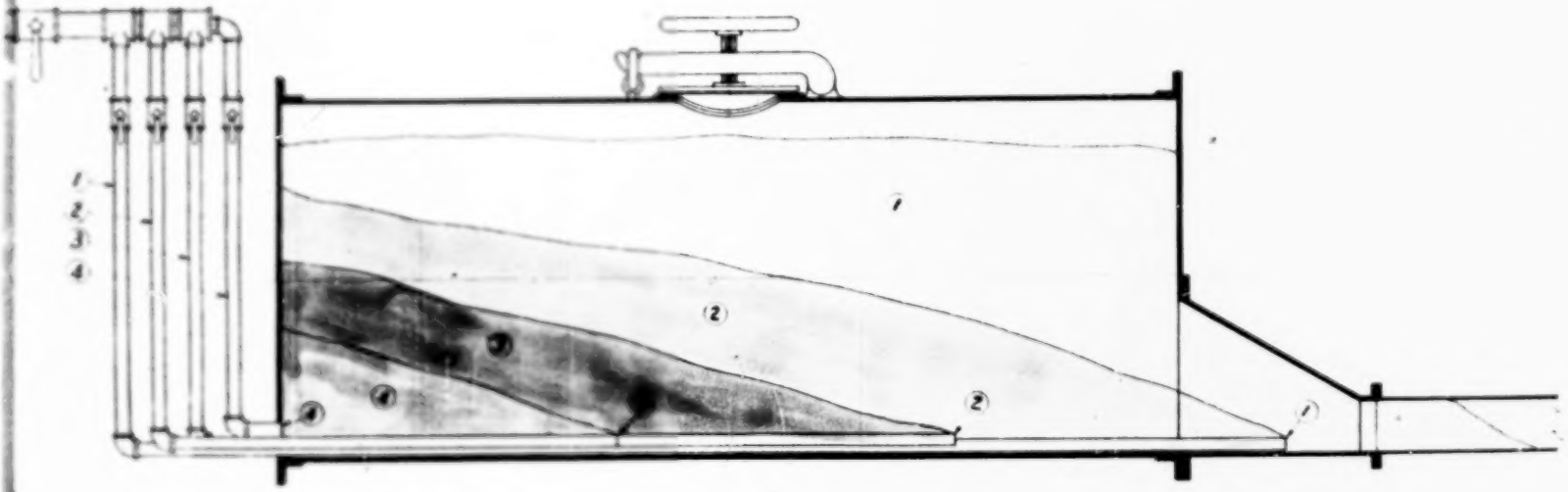
The McMichael device is a vertical container with a tapered bottom, very much in appearance like an inverted milk can only larger.†

The material is delivered into the container at the top and the cover then placed in position so as to make the interior air-tight. Air is then let into the top and the material is blown out through a discharge pipe at the bottom; the discharge being assisted by a secondary air jet or booster jet acting very much on the same principle as a steam injector.

***DEFENDANT'S ENLARGEMENTS.**

* The Court's attention is directed to the amounted enlargements by defendants offered in evidence or which will be used at the argument, to illustrate the true Hackley construction, and also more important patents and some of the publications and uses to which we shall refer in this brief.

†The Canniff machine in evidence (Exhibit 179), which considerably preceded McMichael, will give the Court a good idea of the construction and operation of a McMichael machine.



LONGITUDINAL SECTION OF HACKLEY CONCRETE GUN
Showing Scheme of Discharging Concrete.

DEFENDANT'S APPARATUS.

The apparatus charged to infringe is that illustrated in the Hackley patent. (Exhibit Book, p. 78; Defendant's Exhibit 180—Enlargement; and also in the photographs Exhibits 181-2, Exhibit Book, pp. 683-4.)

Fig. 1 (enlargement Exh. 180) of the Hackley patent is a correct drawing of the defendants' apparatus used at the Skagit job and charged to infringe. It has four pipes numbered 14, 15, 16 and 17 for admission of air into the **bottom** of the receptacle and **at no other place.**

We produce opposite a correct drawing of the Hackley gun, with its four inlet pipes numbered 1, 2, 3, 4, arranged to discharge in tandem fashion at the very bottom of the tank. **There are no other air pipes in the receptacle and no provision made to admit air at any other point.**

Defendant's machine admits no air to the top of the chamber above the concrete. It blows the concrete out of the horizontal receptacle or gun by a series of air jets in the bottom of the receptacle acting to tunnel out the mass by entraining it with the air from the jets.

As Hackley says in his patent specification (p. 1, lines 66-74):

> "By reason of the separate controls for each of the branch pipes, any one or all of these pipes may be cut in or out, as desired. At the outset it may be necessary only to use the pipe 14, until the concrete near the nozzle is discharged, whereupon the pipe 15 can be turned on, and thereafter

the remaining pipes in succession, until the tank is entirely empty."

And again (p. 1, lines 78-87):

"**There is no need for maintaining any air pressure on top of the body of the concrete.** Hence, with the present apparatus, the concrete does not tend to pack or bridge around the nozzle, as is the case where vertical tanks are used. The mass of concrete which any one air stream is compelled to move is relatively small and unpacked, and therefore the device operates quickly and easily and without danger of becoming clogged."

Referring to the colored plate of Hackley, supra, the gun is shown as charged with concrete and ready to discharge, with the concrete divided into colored sections numbered 1, 2, 3 and 4, corresponding to the respective and similarly numbered air inlet pipes; **these colored numbered divisions representing the portions which are entrained and discharged by the correspondingly numbered air jets in succession.** In practice air inlet pipe 1 is first turned on. This causes an underneath tunneling effect on the superposed concrete mass, colored yellow. As soon as or just before air jet 1 has effected its purpose, jet 2 is turned on and similarly blows out the portion of concrete or a part substantially conforming to the blue portion 2, pipe 1 remaining open and assisting in the discharge. Then jet 3 is turned on to discharge the mass corresponding substantially to the part marked 3 in red, being assisted by the jets 1 and 2; and finally jet 4 is turned on to blow out the remaining portion of the concrete mass colored green.

The manipulation of the air jets is such that the discharge takes place substantially continuously to give an even, steady and comparatively smooth flow. At all times care must be used not to blow the concrete out explosively so as to injure or destroy the forms or displace the metal reinforcements.

Furthermore, there is a sound reason why Hackley does not admit air to the top of his concrete: The Hackley apparatus being a **horizontal** one with a convergent forward discharge, if **air pressure were applied on top of the concrete in Hackley, it would be of no value since it would escape through the discharge pipe following lines of least resistance and without doing any good.** In fact, it would interfere with the proper functioning of the Hackley principle of undercutting or tunneling the concrete out by the bottom air jets. In McMichael and in Smith the apparatus being vertical and the discharge being at the bottom, it is practicable and necessary in fact to use top air pressure.

PLAINTIFF'S DECEPTIVE DRAWING OF DEFENDANT'S MACHINE.

The Court is cautioned concerning plaintiff's misleading Exhibit 13 (R-84 Exhibit Book), purporting to show the Hackley machine. This drawing is reproduced twice in plaintiff's brief: opposite pages 22 and 76. Not only was this machine never used but there is serious doubt if it ever existed. **All witnesses say it was never used.** Yet plaintiff says of this trick drawing, page 2 of its brief:

> "The drawing, Exhibit 13, shows an early form of the respondents' (Hackley) machine **as used** at the Skagit River Project."

The same misstatement is repeated at page 22.

Hackley on the stand, when called as the first witness for plaintiff, pointed out the errors in plaintiff's Exhibit 13, at least one of which most glaring errors (pipe 27A) plaintiff admitted by correcting the drawing in red pencil. **Upper pipe 27 (whatever its intended purpose may have been), was never used at any time by anybody.**

Plaintiff sought to justify this drawing Exhibit 13, by the witness Oxenham, who proved on cross-examination (R. 82) to be a Mortgage Loan Clerk with no interest in nor special knowledge of concrete handling machines; never had seen one before and had never seen one since; was not an engineer nor even a draftsman; did not make the drawing and did not know who had made it, but **thought** it was made in the office of the plaintiff's attorneys in Chicago; nor had he taken any notes when he casually visited the Skagit Tunnel on October 10, 1923 (four years before he testified!).

Exhibit 13 was twice rejected when offered in evidence (R. 77 and 87). It was first offered and rejected (R. 77):

> "Mr. Townsend. We object to that as no proper foundation having been laid. * * * The witness has said that it is not a correct drawing of his apparatus.
>
> The Court. It will be rejected at this time. Make one, if you can, based upon the witness' testimony.

> Mr. WILLIAMS. I would like to have this drawing that the witness has testified regarding marked for identification as Plaintiff's Exhibit 13."

At R. 87, during the examination of Mr. Hackley, a further effort was made to introduce it without success, and at that time **Mr. Hackley stated positively that pipe 29 was never in there.**

Thus (R. 87):

> "Mr. WILLIAMS. I think now with this further testimony I shall offer in evidence the drawing which was formerly marked for identification as Exhibit 13. I think that is sufficiently established now.
>
> The WITNESS. **That pipe never was in there.**
>
> Mr. TOWNSEND. **29 you mean?**
>
> The WITNESS. **Yes.**
>
> The COURT. The objection will be sustained. Get a correct drawing made and you can produce it, and **do not produce one that may mislead the Court.** * * *"

If the pipe 29 was never there, and its existence is so critical to plaintiff's case, then we insist that plaintiff's persistence in using this drawing justifies the view that it is an attempted imposition upon this Court, the observation of the trial Judge that the presence of such a drawing in evidence "may mislead the Court."

Nothing daunted, plaintiff again sought to justify this drawing, and, despite the positive testimony of Hackley and the showing of the Hackley patent and drawings, finally succeeded in getting their witness Brock (R. 131-2) to say that pipe 29 was on the machine but that it **was never used.** Under such doubt-

ful circumstances the drawing appears in evidence but apparently was not considered worthy of probative value by either the trial Court or the Appellate Court.

Why the appellant so persistently clings to its bogus drawing (Exhibit 13) and deliberately shows an air pipe leading to the top of the chamber, and which pipe does not exist in the Hackley machine, is difficult to conceive unless prompted by some sinister motive to make the Hackley machine out to be something that it is not.

IMMATERIALITY OF ACTIONS IN THE PATENT OFFICE ON THE HACKLEY PATENT.

In order to create a similarity that does not exist between Hackley and McMichael, the plaintiff sought on the trial to introduce a part of the Hackley File Wrapper to show that the specification as issued differed in its language from the original incorrect specification filed on behalf of Hackley. Plaintiff's counsel quote from a part of the original specification and comment on it at length (pp. 24-25 in their brief).

The Hackley patent of course is not on trial. It is in evidence (Exhibit 187) to illustrate and describe the Hackley machine.

Aside from the fact that the Hackley **patent as issued** correctly describes the Hackley machine, such alleged evidence, regarding something that may have taken place **ex parte** in the Patent Office while the Hackley patent was pending, and in regard to which neither the plaintiff nor the defendant were involved nor concerned nor bound, is clearly improper.

> "In *Westinghouse v. Boyden Power Brake Co.*, 170 U. S. 582, 18 Sup. Ct. 707, the court, after alluding to the fact that in case of ambiguity it may be allowable to consult the application and file wrapper 'and possibly written communications which may throw light upon claims that are ambiguous or capable of different constructions,' said:
>
> 'But where the claims allowed are not uncertain or ambiguous, the courts should be slow to permit their construction of the patent actually granted and delivered to be affected or controlled by alleged interlocutions between the officers in the Patent Office and the claimant.'"

Certainly if this rule applied to unambiguous **claims** of a patent **sued on,** it must apply with greater force to the unambiguous **specification** of a patent **not in suit.**

Hackley's gun was evolved from necessity, because the work done by the McMichael* gun on the Skagit job was condemned by the City's Engineers of Seattle as unsatisfactory (R. 421).

NON-INFRINGEMENT WAS THE ESSENTIAL FINDING IN THE NINTH CIRCUIT CASE.

Following the trial lasting several days, the trial judge held that defendants' structure did not infringe plaintiff's patent (R. 610; 23 Fed. (2d) 131). The Court further found that in view of the state of the art the patent was invalid. Or as the Circuit Court of Appeals said in its "Statement of Facts" (R. 668), "* * * the court below found * * * that **even conceding its validity,** it **had not been infringed by the appellee."**

---

* The McMichael structure first used on the Skagit River job and which was discarded as impractical by the City's Engineers, was a licensed machine and is not here involved.

From the ensuing decree plaintiff appealed to the Circuit Court of Appeals for the Ninth Circuit. In a carefully considered opinion that Honorable Court affirmed the lower Court in all particulars (R. 666; 29 Fed. (2d) 838).

DIFFERENT RECORDS AND DIFFERENT DEVICES IN THE NINTH AND SECOND CIRCUIT CASES.

Previously the same patent, but on a very different record indeed, had been before the United States District Court for the Southern District of New York in the so-called *Ulen* case (12 Fed. (2d) 929), which decision was affirmed by the Court of Appeals for the Second Circuit without an opinion (12 Fed. (2d) 931). In that case the Court found infringement as a necessary consequence.

From drawings appearing in petitioner's brief opposite page 76, apparently in the Ulen device, the concrete was admitted into a chamber in front of a piston and was expelled by piston action; possibly assisted by some air pressure.

Moir Patent No. 778,878, dated January 3, 1905 (Defendants' Exhibit 146, Book of Exhibits 520), is an apparent replica and an anticipation of the so-called Ulen device.

As showing how uninformed the Court was in the *Ulen* case of devices of the prior art, attention is called to Figure 1 of the Moir patent (page 520, Book of Exhibits).

In Moir the same sort of a horizontal apparatus with expelling piston is used **in tunnel lining,** but without any supplemental air. Note the following from Moir (p. 522, Book of Exhibits):

"This invention relates to apparatus which is adapted to facilitate the supply under pressure of lime-grout, liquid cement, or other viscous fluids which have the quality of quickly solidifying for the purpose of filling up vacant spaces—as, for example, the spaces surrounding the metal sections which form the lining of tunnels of modern construction. **According to the arrangement at present in use for this purpose in tunnel construction a mixing vessel is provided having a cover which is adapted to be opened to receive the materials which compose the grout and to be closed in an air-tight manner after the mixing has been effected.** Air under considerable pressure having previously been forced into a reservoir by an air-pump driven by an engine or otherwise, a **communication is made between the reservoir of air and the upper portion of the mixing chamber,** and the grout is thereby forced through a stop-cock opened for the purpose into a flexible pipe which leads to the place where it is wanted. Delay in starting the forcing of the grout or any subsequent cessation of the forcing which may occur before the vessel and delivery-pipe are emptied of their contents gives an opportunity for the partial setting of the grout and necessitates the provision of a very considerable pressure in the air-reservoir to overcome the initial resistance on starting or restarting, whereas a very moderate pressure will in general be sufficient to maintain the flow of grout against the normal working resistance."

IF ULEN INFRINGED, MOIR ANTICIPATED McMICHAEL.

It certainly required no invention, **in view of the notice Moir gives of the use of compressed air for expelling cementitious mixtures,** to have incorporated that feature into his patent.

We venture to say that if the Moir patent had been brought to the attention of the New York Court in the

Ulen case, it would have applied the maxim that "That which infringes, if later, anticipates, if earlier;" and, therefore, the Ulen device being similar to Moir and defendant contending that Ulen infringes McMichael, Moir anticipates McMichael.

This is mentioned merely to show how different our record is here from those of the New York cases.

In the subsequent *Powers-Kennedy* suit (27 Fed. (2d) 668), in the same District, before the same Court, on what was substantially the same record that was before it in the *Ulen* case and on a structure even more closely resembling the McMichael structure than did the Ulen structure, the Court quite naturally found the patent both valid and infringed.

NON-CONFLICT OF DECISION ON INFRINGEMENT.

In finding non-infringement of McMichael by the Hackley device Judge Bourquin said (23 Fed. (2d) 131, 132-3):

> "The charge of infringement against defendants is predicated upon their use of Hackley's apparatus patent 1,619,297 of 1927. This latter is an oblong container, ovoid in cross-section, without upper air pipes. The discharge pipe is at the bottom and one end, and the disposition of the lower air pipes is entrance at the bottom, pointing towards the discharge pipe, one opening into the entrance of the latter, one opening into the opposite end of the container, and between them open the other two and equalizing the distances between all of them in order. In operation the container filled, the air is first admitted through the pipe opening in the entrance to the discharge pipe, and thereafter through the others progressively to the rear as the concrete subsiding in

front of them is driven out through the discharge pipe."

And (p. 135):

"That serves to dispose of the case, and the defense of non-infringement needs no more consideration than to note that Hackley's apparatus is a different combination than McMichael's, has no upright cylindrical hopper bottom container, is without the U-bend, employs no upper air, save some incidental back pressure, does not discharge slug fashion, as claimed is the invention of McMichael, and so **does not infringe.**"

CIRCUIT COURT OF APPEALS FOR THE NINTH CIRCUIT.

The Ninth Circuit Court of Appeals necessarily affirmed the finding of non-infringement when it affirmed the lower Court's decree.

The Appellate Court clearly appreciated the differences between the Hackley Gun and the McMichael device and that these differences were differences in principle fully sustaining the trial Court's finding of non-infringement, for in conclusion the Appellate Court said (p. 841):

"whether or not the appellant's apparatus operated to deliver concrete in slugs or sections, it is very clear that the Hackley apparatus operates in delivering a constant stream of concrete, interrupted only so far as it is interfered with by the air which accompanies it through the discharge pipe. Hackley used a horizontal tank, and in his specifications he said: 'With the present apparatus the concrete does not tend to pack or bridge around the nozzle, as is the case where vertical tanks are used. The mass of concrete which any one air stream is compelled to move is relatively small and unpacked, and therefore the device operates quickly and easily, and without danger of becoming clogged.' **The**

decisions in Concrete Mixing & Conveying Co. v. Ulen Contracting Corp. (D. C. 12 F. (2d) 929, and Concrete Mixing & Conveying Co. v. Powers-Kennedy Co. (C. C. A.) 27 F. (2d) 668, relied upon by the appellant, were based on records widely different from that in the case at bar.

"The decree is affirmed."

That the Second Circuit's decisions finding validity **and infringement** are not in conflict with the foregoing finding of the Ninth Circuit is likewise recognized by the Second Circuit Judges, for they use language not dissimilar to that just quoted above from Judge Gilbert's decision. Thus Judge Swan, speaking for the majority of the Court, said (27 Fed. (2d) 668, 670):

> "In the suit against Storrie & Co., Judge Bourquin seems to have relied to some extent, at least, upon **patents which were not in the record in the Ulen Case and are not now before us.**"

What is, however, of more importance is that as already pointed out, the respective **defendants' devices** in the two cases (the Powers-Kennedy device and the Storrie device) were very different and **fully justified different conclusions as to infringement in the two cases regardless of validity.**

Such conclusions are not necessarily in conflict and do not of themselves give rise to such alleged conflict of decision as to warrant this Court in taking jurisdiction of these cases. As far as the Ninth Circuit is concerned, that Court has said that the Hackley patented device, under which the Storrie Company operated, would not infringe, even assuming the McMichael patent valid. In other words, a review of the records here would not alter the finding one way or the

other in the *Storrie* case, since infringement being a **question of fact** the findings of the lower Courts on that question will stand disturbed.

> "Infringement is a question of fact. * * * This Court accepts the findings of fact made by the Court of Claims and cannot review them." (*Stilz v. United States*, 269 U. S. 144; 70 L. Ed. 202.)

Previously this Court has said in the Paper Bag cases, 210 U. S. 405, 28 Sup. Ct. 748; 52 L. Ed. 1122:

> "The lower courts, therefore, found that the invention was a broad one, and that the machine used by the Continental Company was an **infringement.** And these were **questions of fact** upon which, both of the courts concurring, their findings will not be disturbed, unless clearly wrong."

This Honorable Court is, therefore, confronted at the outset with the question as to whether the writs bringing these cases here were granted inadvertently or not.

Keller v. Adams-Campbell Co., 264 U. S. 314, 68 L. Ed. 705;

Layne & Bowler Corporation v. Western Well Works, 261 U. S. 387, 67 L. Ed. 712.

THE RECORDS.

The record in the *Storrie* case is very different from the records before the New York Courts:

(a) Now, and for the first time, the correct principle of operation of these devices has been fully developed.

(b) Prior uses, prior patents and publications and practical demonstrations not before the New York Court were here offered by the defendants and considered by the Honorable Trial Judge and by the Ninth Circuit Court of Appeals.

(c) The decision in *Concrete Appliances Co. v. Meinken,* 262 Fed. 964 (6 C. C. A.)* principally relied upon by the New York Court in the *Ulen* case as to what in the law of patents constitutes "double use" or "analogous use," was subsequently overruled by this Honorable Court in *Concrete Appliances Co. v. Gomery,* 269 U. S. 177.

Subsequently the Third Circuit Court of Appeals, considering the same patent, in *Concrete Appliances Co. v. Gomery,* 291 Fed. 486, held that **to employ apparatus and methods formerly used in handling grain, coal, etc., for purpose of distributing concrete was not invention.**

The two cases were then brought to this Court on certiorari and this Court in 269 U. S. 177, supra, sustained the Third Circuit. That finding of this Honorable Court was taken by the Ninth Circuit Court of Appeals as the law of the present case.

HISTORY OF THE McMICHAEL INVENTION.

While considerable testimony was offered on behalf of plaintiff to establish commercial success for the

*That suit and *Concrete v. Gomery,* 291 Fed. 486, post, both involved the Callahan patent 948,719 for "Material Transferring Apparatus" designed for flowing concrete or other plastic materials from a suitable source of supply to working points on a building under construction.

McMichael device, that evidence is not entitled to much weight under all the circumstances.

No extent of use of a patented article can supply the want of actual invention or cure the vice of mere aggregation of parts.

Adams v. Bellaire Stamping Company, 141 U. S. 539, 12 Sup. Ct. 66, 35 L. Ed. 849;

Lehigh Valley R. Co. v. Kearney, 158 U. S. 461, 15 Sup. Ct. 871, 39 L. Ed. 1055.

The record is silent as to who McMichael was or what he had done, if anything, with his invention prior to the filing of his application on January 14, 1907. McMichael died many years ago. Aside from this record date and the history of the patent application in the Patent Office, as shown by a certified copy of the file wrapper and contents (Defendants' Exhibit 134), the first heard of McMichael is in 1909.

Mr. Kirkland, plaintiff's engineer, testified (R. 98) that he had been with plaintiff since 1913 and first heard of the McMichael apparatus in Cleveland, Ohio, **in 1909:**

> "I heard that McMichael was **experimenting** with a machine on the Dennison Viaduct where he was placing concrete through a 6″ pipe, 80′ in height. I was then engineer for the contractor in charge of the construction of the Rocky River bridge there.* This was in 1909."

* For some unaccountable reason this condensation by plaintiff omitted the further important statement by the witness Kirkland which appeared in the record in the Court below where the witness said following the word "there": **"and we considered the use of sand apparatus for placing concrete in our arches".**

Possibly the reason the appellant suppressed that statement of Mr. Kirkland was because a "sand apparatus," i. e., the sand blast machine, was the most natural thing to be suggested to the mind of an engineer like Mr. Kirkland. In fact, **the McMichael apparatus is only a "sand blast apparatus" applied to a slightly different use.** (See Kolsche patent, R. 659, Book of Exhibits.)

Previously (R. 94) Mr. Kirkland said it was about 1909 that the plaintiff began making and leasing the McMichael apparatus. The McMichael file wrapper reproduces (pp. 269-271 Exhibit Book) an article published in "Engineering News" August 10, 1911, descriptive of a McMichael apparatus, modified from the patent drawings, however, where the secondary air was let in at an elbow of the discharge pipe exteriorly of the cement container. (See enlargement.)

That article, descriptive of the McMichael device, is most instructive, and, as an admission against interest, goes far to disprove many of the arguments advanced here for the plaintiff. For instance, plaintiff-appellant lays great stress on the use of the McMichael apparatus for shooting concrete only, and that a grout gun is not applicable for shooting concrete; **whereas this article says that the said McMichael apparatus was actually used for conveying both concrete and grout.** Thus:

> "An interesting application of this device is in delivering the concrete for the lining of the La-Salle St. tunnel under the Chicago River. * * * * * * * * * * * *
>
> **"The same machine had been used previously in grouting the broken stone dumped inside the cofferdam at the connection with the north approach or shore tunnel.** Before dumping the stone, vertical 2-in. grouting pipes about 4 ft. apart were secured in place, their lower ends extending to within 6 ins. of the bottom. A hose pipe was attached to each pipe in turn and two 8-ft. layers of stone were grouted in this way. The grout was forced to a total depth of 52 ft. from the mixer and was discharged under water,

the cofferdam not being pumped out. It also forced its way under the tubes to a horizontal distance of 27 ft. from the pipes."

How does plaintiff-appellant have the face to contend now that grout guns of the prior art, working just as McMichael works, are not pertinent art?

CONCRETE AND GROUT.

The term "concrete" as used in concrete work hardly needs definition. It is widely used in buildings, in roadwork, sidewalk construction, etc. It is usually a flowable mixture of cement, sand, gravel, broken rock and water.

"Grout" differs from the ordinary concrete only in degree of flowability. **Grout is Liquid Concrete.***

"Cement" is the active element of both "concrete" and "grout."

The machines for shooting "concrete" and "grout" are used interchangeably. This is particularly so

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*See Defendants' New York Exhibit 111, Lewis & Chandler "Popular Handbook for Cement and Concrete Users" by Norman W. Henly Pub. Co., 1911, pages 375-385; see enlargement of first page.

Cement and concrete were known to the ancient Egyptians 4000 years before the Christian era.

The Romans built aqueducts, tunnels, sewers and buildings of it. The Parthenon, whose dome is 142 feet in diameter, has withstood the ravages of 19 centuries.

The manufacture of hydraulic cement was a lost art during the Middle Ages, and was rediscovered by John Smeaton in England in 1756 in building the Eddystone Lighthouse.

A history of cement and concrete is given in Reid's "Concrete and Reinforced Concrete Construction" (1908).

The first use of reinforced concrete was at the Paris World Fair—1855—where a small boat of wire netting and cement was exhibited. (Reid p. 4.)

The first reinforced bridge in the United States was built in Golden Gate Park, San Francisco, in 1889, by Ransome & Smith. (Reid p. 5.)

with Defendants' apparatus known as the "Hackley Gun." (R. 425; photographs, Exhibits 181-2.)

CONCRETE AND GROUT DIFFERENT ONLY IN DEGREE; BOTH A CONCRETE.

As Judge Bourquin said (R. 616):

> "The variety of concrete is not material, save in respect to the mere incidentals of pressure and size of container, load, and discharge conduit.
>
> "In any apparatus, including McMichael, the concrete must be flowable in quality, and the pressure in due proportion to the weight and friction of the load ahead of it. To suit these incidentals to circumstances is mechanical, and not invention.
>
> "And this is true, be the container capacity or load discharged in one slug (continuous stream) or in several shorter slugs."

WITH THE ADOPTION OF "WET" CONCRETE AS RECOGNIZED STANDARD PRACTICE THE ADOPTION OF THE CONCRETE GUN WAS A MATTER OF COURSE.

We do not find any impressive adoption and acquiescence favoring McMichael. The growth in favor of the concrete gun has been one of gradual development and of increased use of wet or "flowable" concrete; a situation closely paralleling that set out by this Honorable Court in *Concrete Appliances Co. v. Gomery*, supra:

> "The fact that so many persons caught the idea goes rather to prove that it was simple and obvious, and not that it required inventive genius to conceive. It is not like the case where the art is

waiting for the device, and inventors striving unsuccessfully to produce it, under which circumstances invention may well be held to appear." (*Elliott & Co. v. Youngstown Car. Mfg. Co.,* 181 Fed. 345, 349.)

FLOWABILITY.

The requirements of a concrete mixture suitable for shooting by compressed air were admitted by plaintiff's witness Mr. Robinson (cross-examination on rebuttal) of the Ransome Company, to be that specified in a publication of the "Portland Cement Association" and read to and approved by the witness:

"TRANSPORTING CONCRETE:

"As in the case of measuring equipment, selection of means of transporting from the mixer to place of deposit is primarily a question of economy, the only qualification being that the means selected must not interfere with the delivery at the place of deposit of concrete of the proper quality. **The design of the mix may be governed largely by the type of equipment to be used in transporting concrete.** If chuting equipment is to be used the slope and length of the chute may be adjusted to permit the movement of the desired mix or the mix may be adjusted to fit the slope of the chute. **The extra cement required to maintain quality with the increased flowability** may easily be justified by the saving in transportation costs.

* * * * * * *

"CARE IN PLACING:

"No element in the entire cycle of concrete production requires more care than the final operation of placing concrete at the ultimate point of deposit. With a well-designed mixture delivered with proper consistency and without

segregation, placing of concrete is greatly simplified, but even in this case care must be exercised to further prevent segregation and to see that the material **flows readily** into the corners and angles of forms and around the reinforcement."

SOME FACTS OF COMMON KNOWLEDGE.

Having in mind *Concrete Appliances Co. v. Gomery*, supra, this Court will take judicial notice of the following facts leading up to the natural adoption of wet concrete and flowing it either by gravity or by air pressure to the desired point of deposit.

Previous to 1900, or thereabouts, we had the following situation:

Abundant labor at low costs.

Lack of capital to buy plant and equipment.

Lack of convenient mechanical equipment and electric power for construction jobs.

Concrete specifications called for dry rammed concrete—many engineers looked unfavorably on machine-mixed concrete.

As a result brick and mortar were largely used in building construction. Masonry was used largely on dams instead of concrete. These types of construction required a minimum of lime or cement; a maximum of labor. Tunnels were largely lined with timber, timber being replaced from time to time as it decayed. Concrete was little used for tunnels—where a permanent lining was used, brick was the more common selection.

By 1905 the transition from the use of man power to mechanical agencies was in full swing. In the concrete industry this was brought about by the following:

1. Electric power lines were being extended, making the more convenient electric motor available to operate constructive equipment.

2. Engineers were using reinforcing steel much more extensively. This required a change from dry, stiff concrete to plastic concrete. With abundant power, rock could readily be crushed to smaller sizes, thin, reinforced walls of rich, plastic concrete became the practice instead of the heavy gravity walls of the past.

3. Constructors quickly and naturally turned to the methods of other industries—they mixed the plastic concrete in machine mixers instead of by hand, **they flowed their concrete in chute lines as the grain storage plants and other industries flowed their products.** With machinery made more and more convenient and sources of power more at hand and at the same time with hand labor more scarce and at a disadvantage as to unit costs, a great impetus was given to the change.

4. The San Francisco earthquake and fire in 1906, destroying many brick and wood buildings, was a very strong factor in the change to steel and concrete construction.

5. During the same period compressed air began to be available at lower cost and with a greater degree of convenience.

While Smith* had invented a concrete gun in 1872, and was one of the earliest advocates of a plastic concrete that would flow, it required another 30 years for the country to be ready to use his invention by the advent of the automobile and the demand for concrete highways.

Thus about 1905 we find many inventors and users applying compressed air to move grout and concrete, as other industries had previously been using similar installations to move water, sand, grain, mud, rock, sulphur, paint and innumerable other materials.

As the Court of Appeals in the *Concrete Appliances* case, supra, said (p. 492):

> "In the advance in the concrete building art, with the extension towers to great heights and chutes to great distances, the very magnitude and scale of the work are such as to impress the onlooker, and there is danger of one's being misled by their very magnitude into the belief that they must involve invention; but when their principles is sensed it will be found the known principles and practice, which marked the art long before this patent, have simply enlarged as construction enlarged its operation.
>
> "That growth is in this case due to the appreciation of wet concrete, and convinced as we are that in roads, piers, docks, bridges, and buildings generally concrete is the growing material of the future, we believe its advance should be in no way embarrassed by this patent, by which the art is now sought to be blanketed. The court below held the patent was not infringed. We go a step further, and hold Callahan, so far as the claims here involved are concerned, had no such patent claims to infringe."

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*Patent Exhibit 141, Exhibit Book p. 483; Smith machine, Exhibit 186, R. 430.

The two specific proven instances of the use of the McMichael gun mentioned on the stand utterly disproved the extravagant claims made for McMichael by the plaintiff:

(1) Hackley shows that the reason why his gun came into being was because the principle of the McMichael gun was such that the latter was thrown off the Skagit job by the City of Seattle. (R. 77, 421.)

(2) Mr. Peterson on cross-examination testified in regard to his company's experience with a McMichael gun in 1916 in Placer County, California, that it was so unsatisfactory and so **much more expensive** than **hand labor** that they threw McMichael out and went on with hand labor for several years and until the appearance of the Hackley gun. (R. 475.)

THE McMICHAEL PATENT IN SUIT. (p. 320, Exh. Book.)

The patent in suit contains 35 claims, of which Numbers 1, 2, 17, 18, 24, 29, 34 and 35 are alleged to be infringed. Stripped of meaningless words, the broadest of these claims cover the bare thought of filling a hopper with concrete, making the hopper air-tight, and introducing air under compression into the hopper, to force the concrete out through a discharge pipe to the desired place of use.

As originally filed, the McMichael application was for "Improvements in Apparatus for **Transporting Granular and Plastic Building Material such as sand, plaster, Mortar and Concrete.**"

During the more than eight years the application was pending it underwent many and questionable changes; the patentee and the plaintiff taking advantage of every delay known to the law.

THE McMICHAEL FILE WRAPPER AS EVIDENCING DELAY IN THE PATENT OFFICE, TO PROLONG MONOPOLY.

A certified copy of the McMichael File Wrapper and Contents is in evidence as "Defendant's Exhibit 134." (pp. 193-328, Book of Exhibits.) It shows all the proceedings in the Patent Office as far as they are matters of record.

The original application was filed January 14, 1907; first allowed February 23, 1910; allowed to lapse and renewed January 23, 1911; reallowed July 11, 1914; final fee paid January 11, 1915, or on the last day allowed by law. The patent finally issued February 9, 1915, or more than eight years after it was first filed in the Patent Office.

The statute permitted one year between office actions; that is, within one year after a rejection applicant must amend and make reply. Where the first allowance lapsed the statute provided that within six months thereafter the application might be renewed.

The plaintiff took advantage of every delay known to the law.

While these expansions, additions, circumlocutions and delays may not in law justify the Court in holding the McMichael patent invalid it savors of a practice not commending itself favorably to a Court of Equity,

particularly where as here the Smith, Canniff, McIlvrid, Buzzell and Larkin patents have expired, and industry finds progress blocked for years to come if the McMichael patent were upheld, simply by a prolonged monopoly never within the intention of Congress.

This patentee may have been "within the law" technically. While his patent is not made actually void by his dilatory tactics in the Patent Office yet the courts take much notice of such conduct in construing and considering patent claims and have shown themselves strongly averse to sustaining monopolies engineered and prolonged by such questionable methods. (*American Bell Telephone Co. v. National Tel. Mfg. Co.*, 109 Fed. 976; *Herzog v. New York Telephone Co.*, 176 Fed. 349; *Union Sulphur Co. v. Freeport Texas Co.*, 255 Fed. 961.)

In the last mentioned case involving the Frasch Sulphur mining patents here in evidence, the Court said (p. 980):

> "* * * by a consistent series of delays in procedure, whereby the grant of such patents was delayed until 1905. While such course is legal and involves nothing censurable, yet when the practical effect, if the patent is enforced, as now contended for, be, as we have said, to shut out the public from the field of underground sulphur liquefying for 31 years, it behooves a Court, before following such a course, to take great care to avoid being led to a decision which, instead of fulfilling the constitutional purpose of promoting the progress of science and useful arts, in reality blocks the path of improvement."

The McMichael application originally contained six claims, claim 1 of which is typical:

"1. In an apparatus for elevating and transporting **granular and plastic building material**, a closed receiver provided with means for introducing **material** therein, means for supplying air under pressure to the receiver, and a tube to convey the **material** therefrom." (No specific mention of "concrete." The original specification describes the "building material" as "**sand,** plaster, mortar **and** concrete." Page 197, Book of Exhibits.)

In plain language it calls for three things:

(1) A closed receiver 11,

(2) the air pressure pipes 8 or 10 or both,

(3) the discharge pipe 13.

On the first action of January 24, 1907, (promptly taken ten days after filing) this claim and all the claims except claim 3 which was specific to the McMichael structure and terminated with the words "substantially as described" were rejected on references.*

Applicant waited until January 18, 1908, or practically 51 weeks after the first Patent Office action wherein to make reply. This, applicant did, by cancelling claim 1 (quoted above) and claims 4 and 6 and substituting a new claim 4 with a short argument in an attempt to differentiate McMichael from the prior art cited.

Within ten days after this argument was filed the Patent Office on February 4, 1908, (Paper No. 3) allowed two of the four claims, rejecting the others

*At no time did the Patent Office cite the Smith 1872 concrete patent nor the Duckham patents nor any of the other prior art relied on here. The art relied on by the Patent Office had mostly to do with grain and coal conveyors for handling dry materials.

on a new reference—Rosenthal, No. 759,750, dated May 10, 1904, no better than the others.

Applicant again rested a year to a day and on February 4, 1909, filed an amendment cancelling the rejected claims and inserting one in place of the two thus cancelled, leaving two claims in the case and seeking to differentiate the McMichael structure for transporting concrete from other air conveyors cited by the Patent Office.

The next Patent Office action on March 9, 1909, (Paper No. 5) resulted in the citation of three new references and a rejection of all of the claims.

Thereafter and on March 25, 1909, the Patent Office having found certain claims allowable to other parties suggested these claims under rule 96 of the Patent Office to McMichael for the purpose of Interference and gave McMichael twenty days within which to copy them if he desired to enter into the Interference. This was done by an amendment filed April 8, 1909, these four claims being then the only unrejected claims in McMichael.

The history of the McMichael invention discloses an unusual situation and three-fold aspect:

(1) The invention as McMichael applied for it in 1907.

(2) The invention as it finally appeared in the patent as issued in 1915.

(3) The invention which plaintiff now contends for but which was neither originally shown nor described, nor was it suggested as the patent finally issued. (We refer to the so-called "slug" theory of

plaintiff's expert Ray which will come in for more extended discussion later.)

Judge Bourquin refers to these changes and aptly and concisely describes the McMichael apparatus:

> "In the beginning McMichael's application was limited to 'improvements in apparatus for transporting granular and plastic building material, such as sand, plaster, mortar and concrete.'
>
> "Then, as now, the apparatus consisted of an upright cylindrical container, with hopper bottom terminating in a discharge pipe to the hopper connected by a U-bend. Two separately controlled air pipes connected with the container, one at the top, the other near the bottom and pointing downward. The specification in description of function and operation stated that air 'under any desired pressure' admitted through the upper pipe and over the material, by its pressure would force the latter downward and through the discharge pipe; that as the material passed through the U-bend it would be more or less tightly packed, which would tend to 'hold the water and the granular material with which it is mixed intact, so that the tendency to blow the water out of the material is eliminated'; that 'to loosen the material at the lower end of the hopper, should the same become packed, I provide the additional air pipe to discharge air through the material.'
>
> "Of six claims, only one related to the lower air and is as follows: 'an air pipe to deliver air at the lower end of the hopper, substantially as described.' "

DILATORY TACTICS OF McMICHAEL.

Continuing Judge Bourquin said (R. 611):

> "McMichael's prosecution of the application was dilatory to the limit of time, once incurring forfeiture."

(R. 612):

> "In the course of these proceedings in McMichael (to which the comment in Greenwalt's case (D. C.) 3 Fed. (2) 660, is applicable), the invention is expanded to include method, as well as apparatus, and by exclusion is restricted to only concrete."

THE PURPOSE OR OBJECT OF McMICHAEL'S INVENTION.

McMichael's real idea (and the one constituting the theory on which his patent was allowed) was that he would dump into his hopper his "concrete-forming materials" in **unmixed condition,** and that these materials would be mixed and converted into concrete whilst the material, **with a proper amount of water from pipe 12,** was being mauled and turned over and treated **while passing through the delivery pipe.** His invention was as his title imports a "mixing" and "conveying" device.

McMichael, of course, contemplated a **wet flowable** concrete. He says (p. 1, line 64):

> "There is also a valve-controlled water supply-pipe 12 adapted to deliver water at the lower end of the hopper when desired."

(p. 1, line 98):

> "To provide the **required amount of moisture to serve as a lubricant** to start the material out of the hopper and also to aid its movement within the conveying-tube, water from the pipe 12 may be turned into the lower part of the hopper to mix with the material as it enters the conveying tube. This water introduced through the pipe 22 (12?) and mixed with the other materials gives **increased fluidity to the mass and permits it to be more readily handled.**"

Twelve of the 35 claims of the McMichael patent have to do with "the herein described method of treating and conveying a mass comprising rock, sand, cement and water in concrete-forming proportions".

This "mixing" idea is repugnant to any so-called "slug" action.

This idea is emphasized by reference to the Application as filed in 1907.

His object originally was expressed thus (p. 197 Book of Exhibits):

> "This invention relates to apparatus for **elevating and transporting granular and plastic building material, such as sand, plaster, mortar and concrete.** The invention has for its object to provide an apparatus for elevating and transporting material of the character mentioned in a more expeditious manner and with greater facility than is possible by the employ of ordinary methods."

EXPULSION OF THE MATERIALS IS BY THE TOP AIR.

> "In operation, the material to be elevated is deposited in the receiver through the opening therein, falling into and occupying the hopper as shown. The door for the opening in the receiver is then closed manually and the air turned into the receiver from the reservoir, the air in which may be maintained under any desired pressure. The instant the air is turned into the receiver the door for the closure will be firmly held in closed position by the air pressure. Owing to the pressure in the receiver the material in the hopper will be forced downward and directed into the conveying-tube, being carried along by the latter until it is finally discharged at 15."

The purpose of the U-bend was to form a trap to prevent the water from pipe 12 being blown out ahead of the loose solids.

> "Owing to the provision of the U-shaped bend in the conveying-tube immediately after leaving the hopper, the material will be more or less tightly packed as it is directed therethrough.
>
> "This feature of construction tends **to hold the water and the granular material** with which it is mixed intact, so that the **tendency to blow the water out of the material is eliminated.** To provide the required amount of moisture to serve as a lubricant to start the material out of the hopper and also to aid its movement within the conveying-tube, water from the pipe 12 may be turned into the lower part of the hopper to mix with the material as it enters the conveying-tube."

The function of the secondary air jet 11 was thus briefly disposed of:

> "To loosen the material at the lower end of the hopper should the same become packed, I provide the additional air-pipe adapted to discharge air through the material."

The original simple description of 78 lines was in due course (and through 8 years of unexplained delays in the Patent Office) expanded into a seven-column specification 5½ times its original length and embracing new matter apparently never within the concept of the inventor and his original solicitor.

Notice at the very outset the original concept of McMichael, viz.:

> "This invention relates to apparatus for elevating and transporting **granular** and plastic build-

ing material, such as **sand, plaster, mortar and concrete.**"

The "elevating and transporting" of "**concrete**" was a merely incidental object. As we read the specification and the object of "transporting **granular and plastic building material, such as sand, plaster, mortar,**" we have an idea of means as would fit any such air-lift apparatus as would be capable of elevating and transporting similar or kindred plastic materials, such as wet sand and rock in dredging and caisson work by the pneumatic method. Indeed the prior art was full of means and methods for the pneumatic elevating and transporting of granular plastic materials, such as "sand, plaster, mortar and concrete."

McMICHAEL'S ATTEMPT AT DIFFERENTIATION FROM THE PRIOR ART.

McMichael throughout (at least the first three or four years of prosecution of his case in the Patent Office) was seeking to differentiate his apparatus and method where he used air to **push** the material through his pipe, from devices operating by suction, vacuum or induction. For instance, in his argument of February 1, 1909, he argued:

> "It is not seen that any of the patents cited disclose an apparatus suitable for transporting and elevating granular and plastic building material such as concrete and mortar. Surely no device which operates by induction, a device in which the material to be transported is introduced into and carried along in a conductor pipe by a blast of air, could be employed for the purpose for which applicant's device is constructed."

Of course, it was mere supposition that these apparatuses would not work for conveying concrete or anything else within proper limits.

McMichael in his patent says (beginning line 42): that the apparatus is equally suited for handling stiff material **or for material containing an excess of water.**

He goes on to say (beginning line 113):

> "The delivery pipe itself becomes a mixing chamber wherein pneumatic mixing is effected or continued, and, **if this duct is of a size properly related to the other parts, and to sizes of the particles of the materials, the latter can be rapidly impelled through it without danger of clogging or choking.**"

This simply means that you proportion the size of your discharge pipe to the size and character of the material discharged! That is and was necessarily true of Canniff, McIlvrid, Larkin, Leake, Duckham and all the rest.

McMICHAEL RECOGNIZES PRIOR ART FOR ANALOGOUS USE.

McMichael says (page 4, beginning line 29):

> "I am aware that it has been heretofore proposed to employ pneumatic apparatus for conveying each of many materials from point to point. This apparatus has included mechanism for conveying materials like grain and also pneumatic mechanism for transporting materials of a readily flowing or **viscous consistency such as 'grout,' a** composition all of whose particles are minute and easily commingled."

And how does he distinguish his invention from this prior art? Simply by **making his discharge pipe large**

enough to act as a mixing chamber, for he says (beginning line 38):

> "The pneumatic propelling of these various materials has been effected through discharge pipes of relatively small diameter in which because of the fineness of the particles of material transported there was no danger of clogging, and **which were not intended to be used as mixing chambers for the material in transit.**"

Unless we recognize that the only novelty in McMichael is his **handling of initially unmixed materials and mixing them while in transit,** there was absolutely nothing left of McMichael after subtracting the prior art, and that prior art is only the art that he himself cites. When we add to that prior art the numerous instances of prior analogous use and prior patents for handling practically everything under the sun, including concrete, grout, molten sulphur, dredge spoil, sewage, sand and water, etc., it is difficult to see where McMichael made any contribution whatever to the sum of human knowledge.

Not only that, but it is shown that many of the conclusions asserted boldly by McMichael that certain of the prior art would not work for concrete are disproved and that it was only because the Patent Office Examiners thought that possibly he had contributed to the solution of a hitherto unsolved problem and so resolved the doubt in McMichael's favor that the presumption of novelty in favor of McMichael is very much reduced in importance. In other words, McMichael's theory was wrong not only concerning the operation and capabilities of the prior art but he was wrong on the way his own device would work out in practice.

McMICHAEL'S U-BEND 24 THE ONLY NOVEL FEATURE AND THAT IMPRACTICAL.

The record shows that when the bend or elbow 14 is put in, it renders the machine inoperative by reason of plugging. Nevertheless McMichael not only emphasizes this feature and the cone-bottom of this tank in his specification but makes them the subject-matter of certain of his claims.

In the paragraph beginning line 51, page 4, after calling attention to the shape of the vertical hopper 1, with its sloping bottom walls, he says (line 58):

> "This is a matter of great importance where pneumatic pressure is depended on to effect the discharge,"

because of the discovery (?) that the **sloping walls will allow the concrete-forming materials to slide always towards the discharge outlet!** Whereas in other mechanisms of the prior art, which he apparently recognizes, these hoppers are provided with **flat bottoms!** for he says (page 4, beginning line 72):

> "And in this respect the mechanism is contra-distinguished from those in which discharge pipes are connected with relatively flat wall parts of materials containing receptacles."

It seems preposterous that this man or his attorney could even have thought that there was any invention in making the feed hopper of McMichael sloping rather than flat. This much is clear: that in this recognition of pneumatic grout machines prior to his invention, provided with hoppers with flat bottoms, (Canniff had smooth "sloping walls") he was cognizant of probably more than he has fully disclosed

and whatever invention, if any, he had, hung by a slender thread.

When we see the juggling that went on in the Patent Office between the McMichael application, the Leake application and the abandoned divisional application of McMichael, all under common ownership and single control, and the subsequent license under the Buzzell and Larkin patents, the Court should view with caution plaintiff's change of position from what it was when the McMichael application was pending in the Patent Office.

LEAKE AND DARLEY INTERFERENCES.

On May 18, 1909, a formal Interference was declared between the application of McMichael for his "Method of and Apparatus for Transporting Granular and Plastic Building Material" and an application for "Apparatus for Handling Ashes and other Materials" filed by Wm. W. Darly, of Pittsburgh, Pennsylvania, and also an application for "Cement Mixing and Distributing System" filed by Thos. S. Leake, of St. Louis.

The claims in issue in those Interferences conclusively **show possession of the same idea by the earlier inventor Leake** and also show that in the mind of the Patent Office Examiner there was **no difference in principle in conveying concrete** from conveying **dry granular material like coal and ashes** as exemplified in the *Darley* application.

LEAKE'S PRELIMINARY STATEMENT SHOWED PRIORITY OVER McMICHAEL.

Upon the declaration of the Interference, Leake, McMichael and Darley, in accordance with established practice, each filed an affidavit known as a "Preliminary Statement", setting forth the respective dates of conception of the invention, reduction to practice, etc.*

At great trouble and expense to defendant, Mr. Leake was located and his deposition taken. (R. 578-609.)

Mr. Leake is now a resident of Chicago, Illinois, and a respected, substantial citizen of the community. While he was naturally loathe to testify against his assignee he was evidently truthful and thoroughly honest. He gives convincing evidence on operation of his machine as early as 1905 in New Orleans,

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*Section 4904 of the Revised Statutes (Comp. St. 1913, Section 9449) provides that:

> Whenever an application is made for a patent which, in the opinion of the Commissioner, would interfere with any pending application, or with any unexpired patent, he shall give notice thereof to the applicants, or applicant and patentee, as the case may be, and shall direct the primary examiner to proceed to determine the question of priority of invention.

The Patent Office Rules accordingly provide *inter alia:*

> Rule 93. An interference is a proceeding instituted for the purpose of determining the question of priority of invention between two or more parties claiming substantially the same patentable invention. * * *
>
> Rule 94. Interferences will be declared between applications by different parties for patent or for reissue when such applications contain claims for substantially the same invention which are allowable in the application of each party. * * *
>
> Rule 110. Each party to the interference will be required to file a concise **preliminary statement**, under oath, on or before a date to be fixed by the office, showing the following facts:
>
> (a) The date of original conception of the invention set forth in the declaration of interference.
>
> (b) The date upon which the first drawing of the invention and the date upon which the first written description of the invention were made.
>
> (c) The date upon which the invention was first disclosed to others.
>
> (d) The date of the reduction to practice of the invention.
>
> (e) A statement showing the extent of use of the invention.

Louisiana, in the construction of the Stuyvesant Docks.

Leake (R. 582) identifies his sworn Preliminary Statement (a copy of which appears at R. 582) and testifies that the facts therein stated are true.

Leake's Preliminary Statement, as far as dates were concerned, was the same in both the Leake and Darley Interferences.

Leake's dates were:

Conception: February, 1905.

First drawings: March, 1905.

First disclosure: March, 1905.

First full sized machine: September, 1905.

Reduction to practice in the City of New Orleans, September, 1905.

The Leake Interference terminated without the taking of testimony, by **McMichael buying off Leake** for $6000. (Leake assignment, Defendant's Exhibit 136, pp. 474-9 Book of Exhibits) and the latter conceding priority, **despite the fact that he was the prior inventor over McMichael.** Darley, the junior party, was dismissed from the Interference simply because his preliminary statement showed he did not conceive his invention until after McMichael filed his application.

LEAKE, NOT McMICHAEL, THE PRIOR INVENTOR.

The reasons for McMichael buying out Leake after the Interference was declared by the Patent Office are not far to seek. They are found in the Leake

File Wrapper, which is in evidence as Defendants' Exhibit 135, and in the deposition of Mr. Leake (R. 578-609) taken at Chicago on behalf of defendants.

LEAKE PATENT NO. 1,215,558, DATED FEBRUARY 13, 1917, CONCRETE MIXING AND DISTRIBUTING SYSTEMS (APPLICATION FILED OCTOBER 7, 1907), ASSIGNED TO PLAINTIFF.

There is no question but that as pointed out by Judge Bourquin, supra, this Leake device (see enlargement) is for the same invention and purpose as McMichael. This is indicated by its title and by the specification and claims and by the Interference in the Patent Office between the McMichael and Leake pending applications.

The Interference was not decided on the merits of priority nor based on any concession of priority by Leake. Leake, although in his preliminary statement, carried his date of invention back of McMichael, and his present testimony shows that **he was earlier than McMichael,** simply took no testimony because he had sold out to the plaintiff. Having disposed of his interest in the application, patent and invention, Leake had no further reason for following up his application. For reasons best known to itself, plaintiff did not desire to disturb the record priority as it stood in favor of McMichael.

The Leake application was allowed, and then permitted to lapse for failure to pay the final government fee within six months from June 24, 1914, just as was done with the McMichael application.

It was renewed on the **last day of the two years** allowed by law, to wit, on June 24, 1916. (Paper No. 35.) It was thereupon reallowed on July 12, 1916, but again the plaintiff delayed until the last minute; the final fee being paid January 12, 1917, or the last day of the six months allowed by law. The patent issued, therefore, on February 13, 1917.

This Leake application, owned and engineered by the plaintiff, further illustrates a studious system of delay and inexcusable laches.

The four claims of the Interference are substantially claims 1 to 4, inclusive, of the patent as issued.

LEAKE'S TESTIMONY SQUARES WITH HIS EARLY PRELIMINARY SWORN STATEMENT MADE IN 1909 IN HIS INTERFERENCE WITH McMICHAEL.

Despite Leake's reluctance to testify, due to his loyalty to his assignee, the plaintiff, nevertheless he went on to verify the foregoing facts and to show, as follows:

(1) Reduction to practice in 1905 (R. 586-7).

(2) That Leake copied his idea from the air lift (R. 588-9).

(3) That the Leake device of 1905 was quite similar to McMichael is seen by the drawing (Exh. Book R. 694) which he made at the time of his deposition (R. 590-1).

(4) That the discharge in the Leake device was continuous (R. 591, 596-7-8-9, 601-2), thereby refuting the slug theory of McMichael.

(5) That the Leake device used wet concrete (R. 606).

(6) That the cement acted as a lubricant (R. 608).

ACTUAL REDUCTION TO PRACTICE BY LEAKE IN 1905 AS AGAINST CONSTRUCTIVE REDUCTION TO PRACTICE BY McMICHAEL IN 1907.

(1) Leake reduced his invention to practice in 1905.

(2) Against that, McMichael did nothing except file his application in January, 1907, until along in 1909 and after he had heard of the activities of Leake.

(3) Filing an application without any previous showing of inventive work, is termed merely a "constructive" reduction to practice. (*Automatic v. Pneumatic Co.*, 166 Fed. 288.)

(4) **Having made his invention and reduced it to practice in the fall of 1905, Leake had a vested right in the invention and could wait not to exceed two years before he applied for his patent.** (U. S. R. S. 4886.)

(5) If Leake failed to apply for his patent within the two years' period, he merely abandoned his right to a valid patent and what he did in 1905 would inure to the benefit of the public.

It has been aptly said that:

> "Reduction to practice is not merely a matter of construction, building and trial, but may consist in the disclosure of the idea by any kind of description, pictorial, verbal, or written, which will enable one skilled in the art to make and use

> that which is disclosed. We think a drawing may possibly be a sufficient reduction to practice, and an experimental machine insufficient, for the question is one of degree, and the ultimate test is always whether the inventor has shown operative means to that theoretically omnipresent person, the man skilled in the art." (Curtiss Aero & Motor Corp. v. Janin, 278 Fed. 454, 456.)

(In this connection it is to be remembered that Buzzell & Larkin made complete drawings of their invention—so clear that anyone can understand them —on **October 14, 1904** and in **December, 1906,** Exhibits 70-70a, and bound in volume with New York Exhibits. Buzzell & Larkin are entitled to a date at least as early as December, 1906.)

As to the criticism of Leake's testimony that the original machine was not introduced and there were no contemporaneous drawings, that is satisfactorily explained by the witness that the original machine was destroyed. He made no drawings except as finally went into his patent application.

Corroborating circumstances are found in the affidavit of Leake constituting his Preliminary Statement in the 1909 Interference proceedings and concerning facts that happened only a very few years prior thereto. Coupled with this is the promptness with which the plaintiff settled the Interference without taking testimony and paying Leake $6000.00. The cost of an Interference proceeding would be small indeed compared with the amount the plaintiff paid Leake; and if plaintiff had not been convinced that Leake could make good the dates of his Preliminary Statement and anticipate McMichael, it is quite cer-

tain that plaintiff would have gone on with the Interference and saved many thousands of dollars.

Leake's testimony today squares fully with his Preliminary Statement of 1909 and confirms the finding of Judge Bourquin that "despite Leake's reluctance to testify against his assignee, the plaintiff, the evidence in quality and quantity inspires confidence and constrains conviction of the truth of the fact and beyond reasonable doubt."

The Circuit Court of Appeals carefully reviewed the Leake evidence, considered the relationship of Leake to the plaintiff and correctly concluded that as between Leake and McMichael, Leake was the first inventor.

On this branch of the case the Ninth Circuit Court of Appeals said (27 Fed. (2d) 838, 840):

> "The long period of inaction and silence on the part of McMichael, unexplained as it is, together with the payment to Leake of so large a sum of money as $6000, payable as it was in annual installments until March 1, 1920, is strongly suggestive of the inference that McMichael recognized the priority of Leake's invention and could furnish no proof to the contrary. As a witness for the appellee in the court below, Leake testified that he conceived the idea of moving concrete, as set forth in his application, about February 1, 1905; that he made a container in which to put the concrete, and by the means of an air pipe extending therefrom shot it up on top of a power house then being constructed in New Orleans; that, when the air pressure was applied, the concrete all went up and landed on there; that later he built a commercial apparatus in Chicago and operated it in conveying dry cinders to the fifth floor of a building. His testimony, together with his preliminary statement, carried the date of his invention back of that of McMichael and showed

an actual reduction to practice by Leake as early as 1905.

"We find no ground for disturbing the trial court's conclusion. The question at issue was which of two applicants for patent was the inventor. Both presented drawings and plans of the same invention. Leake furnished evidence of the time, place, and circumstances of the reduction of his invention to practice. There was no denial of the truth of his testimony."

None of this evidence in regard to Leake was, as far as we know, ever before the New York Courts.

THE LEAKE APPLICATION.*

Leake's patent application was filed for a "**Cement** mixing and Distributing System." It issued as a "**Concrete** Mixing and Distributing System." Query: what is the difference?

For the first few years of its prosecution and until attorney Bliss (solicitor for McMichael) came upon the field, it was known in the Patent Office as a "**Cement** Mixing and Distributing System." The suggestion to change "Cement" to "Concrete" in the title first appeared in the amendment of April 3, 1912 (Paper No. 28, p. 420 Book of Exhibits), with the request: "In the title as it appears on the file and in the preamble to the specification cancel 'Cement' and insert * * * Concrete * * * ."

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*This Leake application, owned by the plaintiff, further illustrates a studious system of delay and inexcusable laches. While the delay in the *McMichael* case was over eight years, the delay in the *Leake* case was nearly ten years. (For Leake File Wrapper see Defendants' Exhibit 135, pp. 331-470 Exhibit Book.)

The strange part about this otherwise insignificant change of the word "Cement" to "Concrete" in the title lies in the fact that one of the chief claims for originality with McMichael is that he was the first to convey concrete by compressed air, whereas, really Leake establishes as against McMichael, he was the first to convey **concrete** by compressed air as shown by the testimony!

The important question for this Court to decide is whether or not, when it comes to conveying any semi-liquid by compressed air, there is any substantial difference **in mode of operation while undergoing conveying** between concrete and any other cementitious, plastic or semi-liquid material. **The question is not whether cement, concrete and grout are synonymous, when considered in the building trades, but whether or not air acts on one differently from what it does on the other when this air is blowing through a pipe.** The obvious answer is that there is no difference whatever, or if there is any difference it is one of degree.

That McMichael and Leake had the same ideas in mind is seen from the original specification (page 3 of the File Wrapper Exhibit 135). Leake said:

> "The object of my invention is to provide a method and appartus for preparing a concrete mixture and delivering it while in a plastic condition to the place where it is to be utilized. Another object of my invention is to move plastic concrete from one place to another by means of air pressure."

In the enlargement of sheet 3 of the Leake patent drawings the Court will note the bottom slide valves

92-93 and how like they are to the slide or gate valve in the discharge pipe D of the Smith 1872 patent.

Leake's device was more practical than McMichael because **Leake intended to mix his ingredients in a chamber or receptacle 32** by mechanical stirring means 82-83 **(like McIlvrid, Exhibit 151, and New York Exhibits 98, 99, 100-a, 100-b and 101),** so that his concrete was really mixed and in a plastic condition before it entered into the delivery pipe 34.

McMichael, on the other hand, contemplated dumping all his dry materials into his receptacle and adding water as a lubricant and dilutent by the pipe 12; and then blowing it out by the combined air pressures through pipes 8 and 2, depending on the rolling action in the discharge pipe for mixing.

That Leake's idea was not to limit his machine to conveying concrete is seen by the character of his claims, particularly some of his original method claims. As seen by his original claim 19, (page 15 of the File Wrapper):

> "19. The method of conducting plastic material through a closed conduit, which consists in introducing the plastic material into said conduits, causing a difference of air pressure on opposite sides thereof in the conduit, and thereby moving the plastic material along the conduit in the direction of less air pressure."

Stated in simpler language, it merely means that he places his **plastic material** (mud, wet sand, grout, concrete, melted sulphur, etc.) in a conduit and applies sufficient air pressure on **one side** of the material to blow it through the pipe.

Leake's arguments in the Patent Office tend to substantiate the record priority dates of his preliminary Statement. Thus on February 10, 1908, (Paper No. 5, p. 367 Book of Exhibits) he says:

> "The applicant has done a large amount of experimental work in connection with this invention, and the particular embodiment thereof, which is disclosed in his application, is only one of many forms that it may assume. **He has successfully moved concrete** from the place where it is mixed to the place where it is to be used by means of air pressure, using the apparatus disclosed in this application." (Boldface type ours.)

On June 30, 1908, (Paper No. 9, p. 34 of the File Wrapper, p. 378 Book of Exhibits) it was said on Leake's behalf:

> "He has given considerable time and thought to this matter and has actually constructed several plants where this is done. Their operation is highly successful and appears to be a decided improvement over previously known methods for handling plastic concrete."

The Interference came along and plaintiff, through its attorney, a Mr. Bliss, bought Leake off for $6000 (p. 6). No testimony was taken. The Leake patent was held secretly in the Patent Office for ten years and not allowed to issue until after the McMichael patent.

Leake having gotten his price conceded priority to McMichael despite the true facts appearing above. The Interference was discontinued without the taking of any proofs or any adjudication by the Patent Office.

None of these facts, in fact none of the relations between the plaintiff and the several parties concerned, have ever before been brought to the attention of any Court prior to the present trial.

THE LAW OF NEW MATTER AND LACK OF SUPPLEMENTAL OATH.

Following the termination of the Interference favorable to McMichael, his application was passed to allowance February 23, 1910, apparently with the four claims in Interference. Instead, however, of paying the final fee and issuing the patent within six months and after more than three years of dilatory tactics the applicant waits until January 28, 1911, to petition to have the abandoned application revived and renewed. The specification is entirely revised and enlarged by a long amendment filed January 24, 1911. (Paper No. 13.) Not only was the original short and concise description considerably expanded in the light of developments since the application was filed in January, 1907, but there now appears in the patent as new matter practically all of the description beginning page 2, line 25, through to line 75, page 4. Such expansion of an ordinarily simple invention is almost unprecedented and is utterly unjustified by the law and the circumstances of the case particularly when, as here, this new matter was unsupported by a supplemental oath. Twenty-five new claims were added.

That our criticism of the method pursued by McMichael is not overdrawn is seen by the first action

of the Patent Office Examiner on February 18, 1911, in which he said, among other things:

> "The case as originally filed contained not so much as a suggestion of use of the cover 4 as a charge holder. How much of a charge relatively to the capacity of the receptacle could 4 hold? And the suggestion, now, that the upturned flanges of 4 may be extended upward is new specific construction. The matter should be removed from the case. Lines 14-22, page 2, go with the above.
>
> "Lines 1 and 5, page 2, of 'D' **'or otherwise'** is new matter. No means of closing 5 or holding it closed **'otherwise'** than by chain 3a is anywhere so much as hinted. Railway Co. v. Sayles, 15 O. G. 243 is interesting reading in this connection.
>
> * * * * * * *
>
> "Claims 1-5 are to matter not originally set up in any statement of invention or claim and not covered by the oath. Supplemental oath is necessary. That this matter was overlooked as to claims 1-4 in the former allowance, is no reason why it should be overlooked now. The same objection lies to claims 6, 8, 9, 10, 13, 17, 20. These claims also include the new matter above objected to, and are for that reason rejected."

One year and one day after February 18, 1911, (the date of the Examiner's rejection) to wit, on February 19, 1912, there was filed a fifteen page amendment adding a number of new claims, amending others and arguing at length for novelty based mainly on an alleged commercial installation of the McMichael structure.

Accompanying these claims was a new oath* by McMichael directed solely to the new claims that were

*Judge Bourquin pertinently commented on the suspicious circumstances surrounding the presence of this oath in the Patent Office record.

filed with this 1912 or second amendment and having no reference whatever to either the new matter added by the previous amendment of February 18, 1911, or the claims put in at that time and in no wise meeting the objections of the Examiner.

On March 30, 1912, the Examiner acted again, rejecting a large number of claims on the references already of record. To quote from this official action of March 30, 1912 (Paper No. 16):

> "While it is true, a patentee is entitled to all the functions and uses of his device, whether known to or contemplated by him, at the time of his disclosure, or not, and similarly an applicant, that does not warrant him in re-describing, to use terms signifying a specific structure not originally contemplated.
>
> * * * * * * *
>
> "The claims suggest no characteristics of the process, whereby the material loosened, thrown down and mixed by and just in advance of the jet 10, thereafter forms into a compact and piston-like mass forced forward by the aggregate pressure from 8 and 10. Perhaps it is the wet quality of the material that causes the difference of operation, of the device here and that expressed in the last paragraph, page 1 of Wallace.
>
> * * * * * * *
>
> "Claims reciting an old and known combination of elements are not rendered novel by merely their acting upon a different material."

Again the applicant delayed for nearly a year (less one day) or until March 29, 1913, when he filed a sixteen page so-called amendment, again expanding the application, cancelling some claims, revising others and adding a lot of new claims but without a supplemental oath.

In arguing for patentability over the references McMichael, by his attorney, on page 13 said:

> "For the proper operation of applicant's device it is necessary to secure a very high and sudden pressure in the chamber above the materials and this can be obtained only by providing 'means for preventing the flow of the air or materials out of the chamber except through the discharge duct.' In this way the entire energy of the air can be utilized in propelling the mass."

(This is an apt description of the operation of the dredging machines of Hussey and Duckham as well as the earlier concrete and grout guns of Smith, Canniff or McIlvrid.)

A supplemental amendment was filed April 15, 1913; and on May 12, 1913, the Examiner acted on the case, rejecting two of the claims on references; and **one year and two days later,** to-wit on May 14, 1914, an amendment was filed, cancelling the two rejected claims and emphasis being laid on the fact that in the McMichael device the **smoothness of the walls** and the angular disposition of the sides of the hopper were further emphasized. Thereafter the case was allowed as of July 11, 1914.

THE CLAIMS IN SUIT.

The McMichael claims in issue are 1, 2, 17, 18, 24, 29, 34, 35 and are typified by the following:

CLAIM 2: In combination,

(1.) a chamber for containing concrete forming materials [or analogous material],

(2.) a conduit leading therefrom,

(3.) a compressed air inlet pipe, connected to a part of the chamber remote from the conduit,

(4.) and another compressed air inlet pipe leading through the chamber wall and terminating within the chamber near the opening into the conduit in a nozzle directed toward said opening.

CLAIM 17: In a device for treating and moving a mass of concrete forming materials, the combination of

(1.) a chamber for receiving and containing the said mass,

(2.) a discharge duct connected with the chamber,

(3.) an air inlet pipe connected with the chamber,

(4.) means for preventing the flow of air or materials out of the chamber except through the discharge duct,

(5.) means for supplying air under pressure through the said pipe to the chamber back of the mass of materials therein to push the said mass toward and into the discharge duct, and

(6.) means for causing a jet of air to impinge upon successive portions of the mass in the general direction of the discharge duct to directly assist their movement therethrough.

CLAIM 24: In a device for treating and moving a mass of concrete-forming materials, the combination of

(1.) a chamber (1) adapted to receive and contain the said mass,

(2.) a discharge duct (14) connected with the chamber and extending from it to a discharge point in a horizontal plane above the chamber,

(3.) and means (pipe 10) for directing a pressure agent into the discharge duct in the general direction thereof to engage sub-masses of the materials and aid their movement through the duct to the discharge point.

THE McMICHAEL PATENT CONTAINS A MULTIPLICITY OF NEBULOUS CLAIMS CALCULATED TO DECEIVE.

What justification is there for the 35 claims of the McMichael patent? It recalls the warning of this Court in *Carlton v. Bokee*, 17 Wall. 463; 21 L. Ed. 517, 519:

> "If they mean anything more than the claim in the original patent they are void. Being identical with that they are needlessly multiplied, and by exhibiting a seeming of claims to which Reichmann was not entitled they are calculated to confuse and mislead. We think it proper to reiterate our disapprobation of these ingenious attempts to expand a simple invention of a distinct device into an all-embracing claim, calculated by its wide generalizations and ambiguous language to discourage further invention in the same department of industry and to cover antecedent inventions. Without deciding that a repetition of substantially the same claim in different words will vitiate a patent, we hold that where a specification by ambiguity and a needless multiplication of nebulous claims is calculated to deceive and mislead the public, the patent is void."

THE "SLUG" THEORY OF PLAINTIFF.

Plaintiff has throughout all the litigation sought to impress the Court that there is something mysterious and different in the conveying of concrete or cementitious mixtures by compressed air, from conveying other liquid or semi-liquid substances. There is nothing in the patent to support plaintiff's "slug" theory even if the theory was sound, which it is not.

In the prior litigation, much will be found concerning this alleged "slug action"; that is, alternate sections of concrete and air traveling through the discharge pipe; and this was said to be a novel operation invented by McMichael and necessary to the successful conveying of concrete by compressed air. It is plain, however, from a reading of the McMichael file wrapper, that the real reason why the Patent Examiner allowed the McMichael claims was because of a mistaken belief that concrete, for some reason or other not disclosed, was not to be considered in the same category with other mobile substances, such as sand, ashes, and other dry materials, which had been conveyed by compressed air, as shown in numerous prior patents cited by the Examiner. As is not unusual, the patent office failed to find or cite the best art so that whatever presumption attaches to the patent is lessened by just that much.

As time went on, and the practice of employing wet concrete grew, the difference between concrete and grout became largely a matter of terminology, and plaintiffs apparently feared to go before a Court and rely upon this slight distinction in the character of

the use to justify a patent. Some disguise was felt to be necessary; so the slug theory was advanced. Even then, plaintiffs were not original, since the slug or piston theory as applied to air lifts had long before been advanced by Pohle (post) and others.

THE "SLUG THEORY" THE ONLY INVENTION OF PLAINTIFF.

Plaintiff's last-minute strategy succeeded before the New York Court, and this "slug theory" of operation was adopted in its entirety, although it was at best a mere theory, shrouded in doubt. This is clearly shown by the opinion of Judge Augustus Hand when passing upon the same McMichael patent in the subsequent suit of *"Concrete Mixing & Conveying Co. v. Powers-Kennedy."* This same Judge had tried the *Uhlen* case, supra, and might be expected to express a definite opinion in a second trial dealing with the same patent, but found it necessary to resort to speculation on the question of "slug" action.

In the *Powers-Kennedy* case he said:

> "I do not regard it as **theoretically probable** that masses of concrete containing gravel stones of a diameter running to 1¼ inches can be blown long distances by compressed air, and I think the testimony of Mr. Ray (plaintiff's expert) that he could detect the passage of a series of slugs when he put his ear to the outlet pipe, is the **more probable** testimony."

Apparently, Judge Hand was misled by the testimony before him, for it is a fact capable of ready demonstration that rocks as large as **15 inches in**

diameter have for many years prior to McMichael's time been conveyed long distances through pipes by means of compressed air, in connection with dredging and excavating operations. (See Miami uses, post.)

Thus, after two trials before the same Judge, the McMichael patent appears to have been upheld on purely speculative theories which would have to give way when the real facts were shown.

PLAINTIFF'S SO-CALLED "SLUG" THEORY EVEN IF POSSESSING FOUNDATION IN FACT IS DISCLOSED IN THE PRIOR ART.

This slug theory was so insistently and insidiously urged upon the Court of the Ninth Circuit (as it was and successfully so upon the New York Courts in the previous litigation), that we shall digress a moment to refer to two earlier patents, and which patents, as far as we are advised, were never called to the attention of the Court in the *Uhlen* case.

POHLE PATENT NO. 487,639, DEC. 6, 1892.

(Defendant's Exhibit 152, Ex. Book, p. 565.)

PROCESS OF ELEVATING LIQUIDS.

The "slug" or "piston" idea is dominant throughout the Pohle specification and claims as well as the other literature on the subject of the "Pohle Air Lift."

The patentee says:

> "The invention relates to the art of elevating water by compressed air; and it consists in im-

proved processes and apparatus whereby the compressed air is delivered in bulk into the lower end of the water-eduction pipe and the water and air are caused to ascend through said pipe **in distinct alternate layers of definite dimensions.**" (P. 1, line 8.)

And again he says:

"In accordance with my invention the air is not directed into the water in the form of fine jets or bubbles, which would very readily commingle intimately with the water, but **is delivered in mass and the water and air ascend in well-defined alternate layers throughout the eduction-pipe.**" (P. 1, line 23.)

SAUNDERS PATENT NO. 597,023, DATED JANUARY 11, 1898.
(Defendant's Exhibit 153, Exh. Book, p. 571.)

Mr. Saunders was the founder and editor of the publication "Compressed Air" (Exhibit 172) and is the author of the book, "Compressed Air Information." (Defendant's Exhibit 172 for identification.)

He describes in his patent his improvement on Pohle as follows:

"In accordance with my invention the compressed air is not directed into the water in the form of fine streams or jets which would readily commingle therewith, nor is it delivered continuously at the foot of the eduction-pipe, thereby, as asserted by some, **dividing the water into piston-like layers** the existence of which is doubted, nor is either the air or the water started on its upward journey through the eduction or delivery pipe in a continuous stream; but by means of the arrangement of apparatus and the proper regulation of the pressure of the liquid and the gas employed it is so arranged **that**

masses of the liquid and masses of the gas are started up the delivery-pipe in alternation and each with a high velocity, as will appear." (P. 1, line 25.)

Thus Saunders combined with the "ejector" method of Pohle and of McMichael but the added **pressure on top**, of McMichael, all as seen in the drawings and fully described in the specification.

If the McMichael device does work on the "slug" or piston theory the attempt to differentiate it from the prior art fails utterly. On the other hand, it is conclusively shown that the Hackley gun of defendants, does not have any so-called "slug" or piston action but that the **discharge of the concrete is in a continuous, even, steady flow.**

NON-INFRINGEMENT.

Judged by plaintiff's own standards, the machine of defendants does not operate on the same principle as McMichael and, therefore, there is no infringement.

In the *Storrie* case plaintiff unfolded its "slug" theory through the medium of its professional patent expert, Mr. Ray.

To offset Mr. Ray's ingenious theory what had so hoodwinked the New York Court, it was incumbent upon Storrie & Company to show what the true facts were governing the "mode of operation" of the McMichael patent. It was with that end in view that the Western defendant prepared along the following lines:

(1) Exhaustive scientific and practical tests to determine what action actually takes place in the discharge pipe of a compressed air device for conveying concrete or grout, particularly defendant's device.

Accordingly here, with the most accurate and reliable measuring instruments known to science eminent engineers and scientists were set to work to determine the presence or absence of any so-called slug-action in defendant's apparatus. The results of these tests and observations will be found in the testimony of Messrs. Wilkins and Peterson, and analyzed post.

(2) A showing of the common knowledge which existed prior to McMichael's time relative to the presence of a "slug" or pulsating action in air-lift devices used for pumping water, sulphur, mud, sand, etc.

(3) A full showing of prior uses, patents, and publications dealing with the conveying of concrete by compressed air, and of other materials closely resembling concrete and containing rocks of large size.

Depositions were taken in Louisiana, Florida, New York, and elsewhere, which included fact testimony of many witnesses who, long prior to 1907, had employed compressed air for conveying or lifting molten sulphur, a very difficult substance to handle; had used it in large dredging and excavating operations, and were well acquainted with the capability of compressed air to convey mud and "spoil" containing rocks and other solids as large as 15 inches in

diameter and weighing up to thirteen hundred pounds, through pipes over a long distance.

So overwhelming was the evidence offered here by defendant in contradiction of plaintiff's makeshift theory of the presence of a "slug" action, that the trial Court found:

> **"To expect to secure movement of the concrete in alternate slugs of concrete and air would do violence to the laws of Nature and confound reason. It can not be done."**

And again says Judge Bourquin (R. 618):

> **"As between Wilkins' test discrediting the slug theory and Ray's supporting it, the former's is calculated to more nearly approach accuracy."**

The above are **findings of fact** by the trial Court, which this Court in several cases has said should be regarded as unassailable upon appeal. (*Adamson v. Gilliland,* 242 U. S. 350; 61 L. Ed. 356; *Butte Superior Co. v. Clark,* 249 U. S. 12.) The fallacy of plaintiff's theory strikes at the very foundation of plaintiff's case as presented not only in this instance but also in the prior suits in New York. It was because of a failure on the part of the defendants in the New York trials to set the Court right that there resulted the erroneous findings of validity of the McMichael patent.

PATENTS ARE NOT GRANTED FOR A "THEORY."

The former New York suits each went off on the false theory that the **movement of concrete** by compressed air involved a different principle or law

of physics from the movement of other substances by the same medium.

Judge Hand (12 Fed. (2d) 929), adopting the rather plausible but artificial and specious distinction, conceived by plaintiff's expert Ray to fit an emergency, between the movements of concrete and of ashes, sand or water, and found that concrete was not conveyed by the air as mass or float on the air, but **propelled in short slugs*** by air pressure behind each slug.

Judge Hand sought to contrast the movement of concrete, according to his understanding, with the operation of the well-known sand-blast and of pneumatic conveyors used in conveying grain, ashes, coal, etc., by adopting the theory of plaintiff's expert Ray that the action there was a so-called "kinetic"† action or **floating** of the articles by the air stream.

It is obvious that the term "kinetic," when considered in the light of its accepted meaning, is misapplied by the learned Judge.

Aside from the artificiality of this theoretical distinction over the prior art and however meritoriously it may have appealed to Judge Hand on the records before him, the present evidence shows that on which-

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*Apparently Judge Hand was of the opinion that concrete followed the principle of the penumatic dispatch tubes and containers for carrying coin boxes, sales-slips, etc., in common use in department stores, etc.

†"kinetics: The branch of dynamics that treats of the production or modification of motion in bodies; opposed to statics. Compare dynamics.

"kinetic: (1) Producing motion; motor. (2) Consisting in or depending upon motion; active; opposed to latent or potential; as, kinetic energy. Kinetic energy, see energy. (4)-k. theory, any theory of the constituent of bodies which explains their properties by the motion of their particles, especially that theory of gases according to which their elasticity is due to the rapid motion of their molecules, which dart about in straight lines with an average velocity that increases with the temperature until deflected by encounters with one another or with the walls of the containing vessel." (*Standard Dictionary.*)

ever or whatever theory plaintiff here seeks to proceed, there is nothing new in theory or practice.

Moreover, we believe that here the professional expert Ray is entirely discredited, and that if he believes what he testified to, he does not know what he is talking about.

FALLACY OF THE SO-CALLED "SLUG" THEORY OF PLAINTIFF.

In the first place patents are not granted for theories. Just why plaintiff lugged it in we do not know except as we pointed out earlier in this brief as a camouflage to otherwise patent invalidity.

The only sponsor for the slug idea is Mr. Ray, the professional patent expert. His lack of qualification to speak on the subject is apparent, however capable he may be in some other lines.

Not a single practical man knowing anything about the use of these apparatuses was brought forward by plaintiff even to suggest the idea that concrete was conveyed any differently than anything else by compressed air.

Concrete flows by gravity like other mobile substances. Also, it is blown by air like other mobile substances.

This Court is too well informed on the general laws governing the flow of liquid, gases and other mobile substances to be more than reminded that there is such a thing as air slippage, and skin friction of the material in a pipe. If the friction is too great and

the air cannot slip by, the apparatus will plug up. The skin friction of a compacted mass impervious to air is enormous.

Any so-called "slugs" of such dimensions as Ray mentions (R. 143-145) would result in instant stoppage.

In any event a slug is a plug; a plug is a stoppage; a stoppage is a shut-down; and it takes very few shut-downs to make a failure.

Compressed air under 100 lbs. pressure when released does not wait for any roll-call of slugs. It tears into the mass at high velocity and seeks outlet along lines of least resistance. A tornado in concentrated form turned loose would represent about the degree of orderliness that occurs in the mass in the discharge pipe. The little movie pictures in evidence as exhibits showing the blowing effect of water, grout and concrete, represents what takes place, to discredit the theory of the plaintiff. These pictures are proof positive to the effect that the action is the same whether water, grout or concrete is being expelled by air pressure.

THE PLAINTIFF'S TESTS BY RAY PROVE NOTHING PERTINENT.

The plaintiff's alleged tests prove nothing of any value, nor anything pertinent to the issues, in this case.

Plaintiff's concealment of its tests on *prima facie* when seeking to lay a basis for its theory, served only to emphasize their own lack of faith in their theory.

They paraded it before the Court on rebuttal simply because of the refutation of the theory by the overwhelming proof positive furnished by Mr. Wilkins; and the further testimony of every practical man in this field, that the concrete flowed out of a Hackley gun in an **even continuous flow!**

Even their own and only practical witness, Brock, surprised them when he testified (R. 134):

"A. In placing the floors the gun was not used, no.

Q. Did you ever hear the concrete coming out of the gun at the discharge end?

A. I did.

Q. How did it come out?

A. It came out through the eight-inch pipe, through an apron and the concrete—a concrete strip on both sides.

Q. **It flowed down gently like over both sides?**

A. **Yes, sir.**"

(R. 135):

"The COURT. You worked both without and with the gun?

A. The tunnels with the gun and the floor without the gun."

THE PLAINTIFF'S TESTS BY RAY PROVE NOTHING PERTINENT.

Ray does not set out to make a fair test in the first place. He performs his tests secretly in a laboratory in Chicago. They are not done under even a semblance of working conditions. He says he used rock up to **4 inches** in diameter. He does not use an instrument which is capable of recording either **flow** or **nature of the material** supposed to be under observation.

He places his instrument at a considerable distance from the gun and practically at the end of the discharge pipe. He uses an **elbow** so that the material will be suddenly intercepted and deflected.

The method used by Mr. Ray measures **impact** and **not flow.** It could measure pressure only if on the **side** of a straight pipe. There is no way to convert such data to **flow,** unless both the **velocity** and **nature** (that is, weight) of the moving mass is known.

The data to apply to practice must be taken under substantially operating conditions. This Ray carefully avoided.

The rocks in the concrete traveling at 100 feet or less per second and striking the pad on the elbow would cause **impact** to be recorded. The rubber pad also reduces the size of the discharge line and in combination with the elbow would restrict the discharge and might cause an intermittent flow. The density of the mass is not the same at all points in the concrete discharge and when this mass is traveling at a high velocity would cause a varying impact on the outer side of the sharp elbow.

Ray himself admitted on cross-examination the interruption in flow due to the elbow.

THE HACKLEY MACHINE DOES NOT WORK ON THE SLUG PRINCIPLE.

Plaintiff's witness, Brock, has already been quoted showing that on the Skagit job, the alleged infringing machine delivered the concrete to **flow down gently** and not in any explosive slug manner.

Misunderstanding of plaintiff's counsel of how concrete is delivered by these machines:

At pages 9-12 of plaintiff's brief there is an extended argument to the effect that in the McMichael apparatus the concrete is discharged explosively (as a siege gun firing great slugs of concrete) with such **momentum** (italics theirs) that the concrete is automatically packed. This in the face of all evidence to the contrary and particularly of their witness Brock above quoted as to the **"gentle flow"** of the concrete from the Hackley gun! It is a sample of ignorance of operation displayed throughout the brief. **"Momentum" and "velocity"** at the point of delivery are exactly what the engineers who know anything about this work say **must be avoided,** as otherwise the wooden forms will be knocked down or displaced under such a bombardment and a **separation** of the concrete-forming materials would take place rather than a setting of the concrete properly.

Mr. Hackley tells us (R. 424) that the practice in discharging the concrete into the forms is "to control the discharge and make the discharge **as slow as possible;"** that the purpose of that is to **prevent separation** of the concrete and to prevent also less wear on the pipe; that the flow is **"by gravity"**; and that this flow is "in a **steady stream.**" (R. 425.)

THE PROOF OF THE PUDDING.

In discussing this so-called slug formation and action Mr. Hackley, the practical engineer, says of the impracticability of plaintiff's theory (R. 422-3):

"Q. Have you ever seen a gun of the type or character or design of this McMichael drawing that had a U-bend?

A. No, I have not.

Q. What, from your knowledge as an engineer and your experience in handling concrete materials would be **the effect of the interposition of the U-bend in the outlet of a concrete gun?**

A. **It would form a trap that would prevent the concrete from leaving the gun.**

Q. And the result would be what?

A. A plug.

Q. And when you get a plug, what happens?

A. There is no movement of the concrete or discharge.

Q. What do you do then?

A. **If it is a serious plug you have either to disconnect the pipe or take the concrete out of the pipe.** You cannot do it by hammering on the pipe.

Q. How did the concrete come out of that gun that was condemned—that so-called McMichael gun? Did it come out in a continuous flow or by a so-called flood (slug) action, such as this expert, plaintiff's expert Mr. Ray has described as in his opinion exists?

A. Came out in a **continuous stream.**

Q. What would be the effect in your experience of a so-called plug action or the cause of a so-called plug action?

A. **If a slug does form in the pipe it will form a plug and stop the action entirely.** In order to have the concrete continue to go through in the pipe, the air has got to go through with it. As soon as the air is stopped the flow stops entirely.

Q. Now, in a machine according to your patent shown on Exhibit 180 before you, or the drawings of your patent Exhibit 180, and the machine used on the Skagit job, claimed here to infringe, how did the material issue from the discharge pipe?

A. **In a continuous stream,** mixed with the air."

Hackley further testifies that this discharge was as slow as possible to prevent separation of the concrete and also to prevent excessive wear on the pipe. His experience was the **same with using a Hackley gun for shooting either concrete or grout.** In each case the material issued in a steady stream. (R. 425.) That was likewise the action with the Smith and Canniff devices used in the San Francisco tests.

Mr. Wilkins, speaking from his experience, says (R. 446):

> "A. The general conclusions were that the concrete flowed through the pipe with a proper supply of air, **practically a uniform mixture of air and concrete, somewhat denser at the bottom.** That if the air pressure dropped, you could make it vary somewhat. However, **it was still a mixture of air and concrete.**
>
> Q. Did you ever encounter any slugs or plugs such as Mr. Ray, plaintiff's expert, has referred to?
>
> A. There were not.
>
> The COURT. Do you mean that this was a continuous flow of the mixture. I want to know if this was a continuous flow of this mixture.
>
> Mr. TOWNSEND. The Court desires to know if this was a continuous flow of the concrete material through the pipe, or was it separated?
>
> A. This particular record so indicates.
>
> Q. Indicates what?
>
> A. **That it was a continuous flow of the mixture of air and concrete.**
>
> Q. And did you observe the concrete flowing or issuing from the discharge pipe?
>
> A. I did.
>
> Q. And how did that correspond in appearance with your scientific record here?
>
> A. **It corresponds to my mind exactly in that it flows out of the end of the pipe much the same**

as the discharge from a deep well turbine pump, I would say.

The COURT. Well, how is that?

The WITNESS. **It has a uniform flow without any spurts or dumps and not necessarily solid."**

Mr. Peterson, another practical engineer, speaking from experience says (R. 458-9):

"The WITNESS. I have observed the operation at Maloneys that Mr. Wilkins testified to.

Q. You did?

A. Yes, sir.

Q. And what were the working conditions under which this test was made?

A. The regular working conditions of placing concrete in the tunnel.

Q. How was the concrete coming out of the pipe? In a continuous flow, or otherwise?

A. **In a continuous flow.**

* * * * * * *

Q. What have you to say as to the theory of Mr. Ray that the concrete in the Hackley gun travels through the pipe in the form of slugs?

A. **It has been my observation that the concrete comes through in a uniform flow of the concrete and compressed air.**

Q. What would be the result of a so-called **slug-action** referred to by Mr. Ray?

A. **It would plug the pipes.**

Q. And what does that do?

A. **That stops the works and it is necessary to take the pipes apart and get out the concrete."**

PLAINTIFF'S IMPACT DEVICE WITH GAUGES IMPRACTICAL.

The Ray's impact contraption is utterly useless as a device for measuring either flow or nature of flow is further shown by his reference to the use of mechanical **gauges** along the discharge pipe. Not only are

gauges **too slow** for registering **variations** in travel of fast moving objects, but a gauge would instantly clog with cement and cease to function. As the Court knows a pressure gauge must have its recording mechanism in communication with the fluid whose pressure is to be recorded. This communication is a small pipe or passage which, of course, would quickly become clogged with cement and sand.

The ridiculousness of such means for the uses here proposed, is indicated by Hackley who says (R. 431):

> "A. If the statement was made that the gauges were put on the discharge pipe, they would not act. They would fill with concrete right away."

Wilkins says the reason he did not try gauges was (R. 445):

> "For two reasons. First, the gauges are unsatisfactory and not fast enough to detect the changes that we desired measured and, second, because any pressure readings taken by a gauge only indicate the pressure at that point and not the nature of the flow."

PLAINTIFF'S MISLEADING AND DECEPTIVE CHARTS.

Plaintiff, in an effort to reconcile the Wilkins tests on behalf of defendant and the so-called Ray tests on behalf of plaintiff, resorts to extreme measures in distorting charts and diagrams, falsifying records and misrepresenting testimony. That is harsh language and can only be justified by showing it to be a fact.

Plaintiff accepts the Wilkins method as scientific and practical. It disputes the conclusions shown by

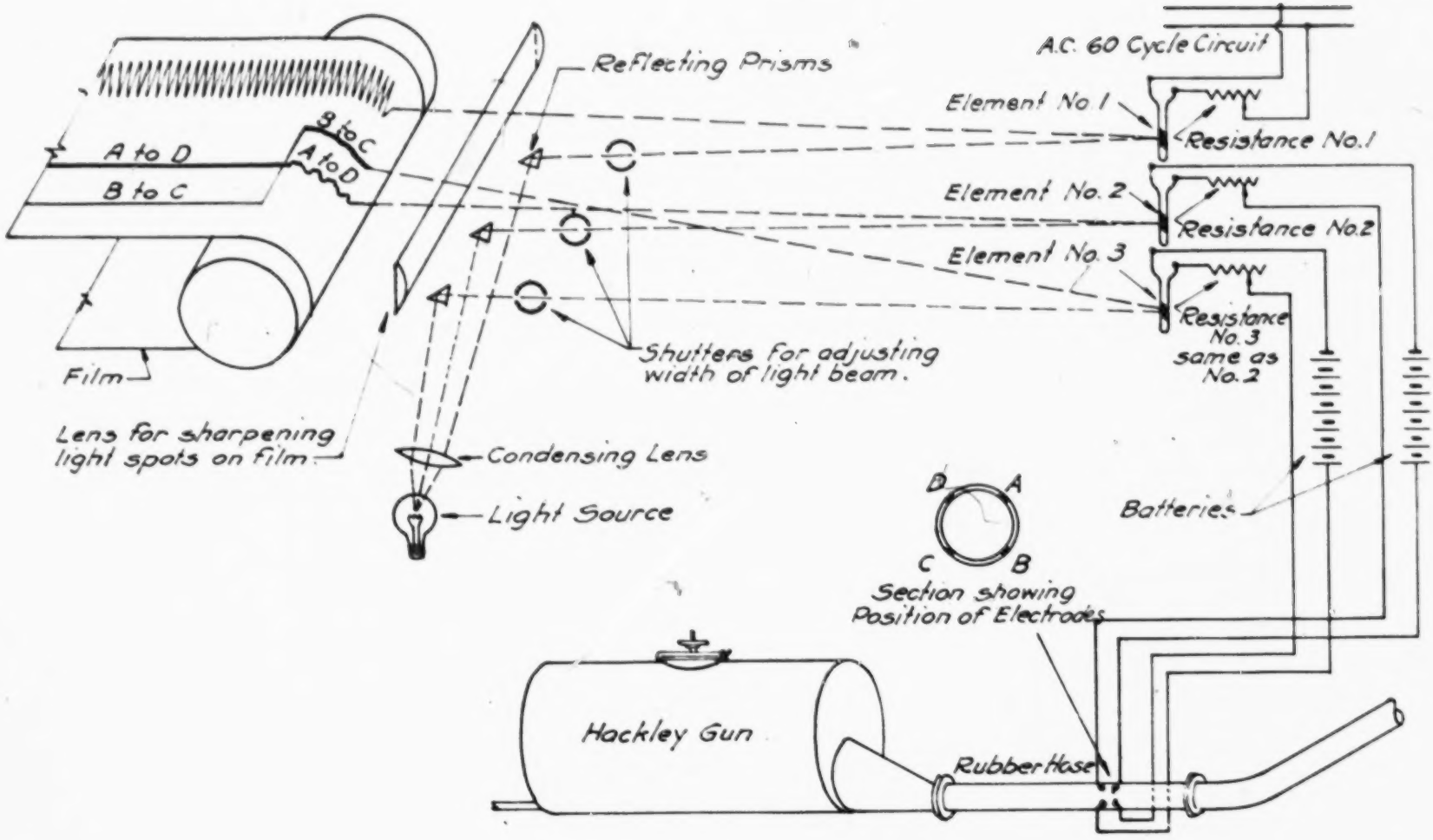


Diagram of Oscillograph and its Connections to the Discharge Pipe of Hackley Gun.
Used to Obtain Exhibit No. 189.

the Wilkins records. But in doing so plaintiff shows either an ignorance of the machine with which it pretends acquaintance, or deliberately misrepresents the facts.

Opposite page 78 of its brief plaintiff presents a chart designated as "Plate Two" which plaintiff tries to pass off as a "diagrammatic showing" of defendant's oscillograph used in making the Wilkins test.

Plaintiff's drawing is not correct. It has been distorted so that the lines B-C and A-D are parallel rather than crossed as they should be, and the upper line A-D is made heavy throughout its length and the line B-C is made thin throughout its length. Those changes, simple though they seem, are contrary to what actually is the case, and such changes being deliberate would, if accepted, result in the deception of the Court.

Opposite defendant has reproduced a correct diagram, showing schematically the mechanism and operation of the Wilkins machine exactly as said drawing appeared in defendant's briefs in the Courts below. A comparison of this diagram with plaintiff's "Plate Two" will at once show the existing differences to which attention is directed.

By way of preface it is to be noted that Mr. Wilkins is a scientist of distinction in this field of research and test work.

Perhaps it would be helpful to quote here first just what he says he did in connection with his tests on a standard Hackley apparatus under every-day working conditions.

He says (R. 443):

"* * * to find out what the nature of the flow of concrete was from a Hackley gun, followed the procedure used in testing the speed of projectiles from large caliber guns, that is, two contacts are made which the projectile will short as it passes them. The current is applied through the circuit which passes through this with an element of an oscillograph, which is a sensitive ammeter leaving a record on a moving film. For the concrete he used a rubber hose six inches in diameter, the same size as the concrete ejection pipe and put in the rubber hose iron electrodes which came flush with the inside of the hose. These were connected with a battery and the oscillograph element in series and a record was taken of the current as the concrete was shot through. Mr. Wilkins stated that if the pipe is full, the concrete as it goes out will give a record on the film. **If the pipe is empty it gives no record at all. If the concrete went out in plugs or slugs, it would give a hump and then drop back to zero** and then drop back and give another hump as each went by. As concrete is mixed with air it gives a deflection that is not as great part way up. If it is perfectly uniform it gives a perfectly uniform straight line. If it is broken up or the concrete changes—the mixture of the concrete and the air changes—it gives a wavy line. From these tests you can determine the exact nature of the flow and about its speed."

THE WILKINS TESTS.

In order to study distribution across a section of discharge conduit, a section of rubber hose as an electrical insulation was interposed in the discharge line about 20 feet from the gun and under regular everyday working conditions with a Hackley gun, such as charged here to infringe and with the **same consis-**

tency of concrete mix as used on the Skagit job. (Hackley R. 427.) Four electrodes were placed equally around the circumference of the hose at each of two sections.

With one oscillograph element on the pair of electrodes at the bottom and one on the pair at the top, an indication of the action for each part of that section was obtained, i. e., for the hose half full of concrete at the bottom and the remainder of the air at the top, a continuous current between the bottom electrodes would be recorded and no current would flow in the two top electrodes; the air being an insulator; concrete being a good conductor.

The current record indicates the time taken for a given volume of air and concrete to pass the electrodes. By virtue of a 60 cycle wave of alternating current simultaneously recorded on the same film, this time was determined.

The tape or oscillogram (Exhibit No. 189 represents practical operating conditions for twenty seconds, with concrete traveling at the rate of 20 feet per second. If there had been any "slugs" of even one foot or less in length, and separated as Ray believed by insulating air bodies, there would have been at least 200 alternating abrupt hills and dales showing on the tape! On the contrary, the concrete body is substantially **uniform and continuous** with air slipping over the top; disproving utterly the Ray fancy.

While our drawing with its legends is largely self-explanatory, a few words further may be helpful concerning its operation.

The oscillograph is essentially an ammeter, or an instrument for measuring the flow of a current of electricity, arranged to indicate accurately currents which may change in amount with great rapidity.

This drawing shows the essential parts of the oscillograph used for the production of Exhibit No. 189 with its connections to the electrodes in the discharge pipe of the Hackley gun.

Three similar elements were employed, marked No. 1, No. 2, No. 3; each consisting of a loop of very fine wire mounted in a strong magnetic field produced by magnets which are not shown.

Electrical current passing through a loop in one direction causes that loop to rotate clockwise. Current passing through the same loop in the reverse direction causes that loop to rotate counter-clockwise. An alternating current causes the loop to oscillate. At any instant of time the amount of rotative movement of a loop is exactly proportional to the current passing through the loop.

Rotative movement of a loop is indicated by a beam of light reflected from a tiny mirror which is attached to the two wires of the loop. The light reflected from the mirror is projected onto it by an optical system consisting of a source of light, a condensing lens, a prism for directing the light onto the mirror and a shutter for adjusting the width of the beam of light. The beam of light reflected from the mirror passes through a lens which sharpens the beam before it falls on the sensitized film. The film is moved at a

uniform rate to the left,—hence any varying deflection of the light beam will trace a wavy or irregular line on the film.

Element No. 1 was connected to a 60 cycle per second alternating current source through Resistance No. 1. This element recorded a 60 cycle wave on the film for the purpose of securing an accurate record of time.

Element No. 2 measures the current derived from a battery limited by Resistance No. 2 to a safe amount for the element and controlled by the resistance encountered between electrodes A and D. The deflection of the line A to D on the film from its base represents the reduction in resistance between electrodes A to D.

Similarly Element No. 3 measures the current derived from its battery, which is exactly the same as the battery of Element No. 2, limited by Resistance No. 3, which is exactly the same as Resistance No. 2, to a safe amount for the element and controlled by the resistance encountered between electrodes B and C. The deflection of the line B-C from its base represents the reduction in resistance between electrodes B to C.

It will be noticed on the film, Exhibit 189, that the deflected line B-C crosses over the line A-D near the beginning of the film. This is indicated on this chart, supra. **The comparatively great deflection of B-C is caused by a much larger reduction in resistance from B to C than from A to D, due to the arrival of much more concrete between B and C than between A and D.**

In other words, the mirror of Element No. 3 was rocked to the right so as to transfer the point of projection of its light beam from the position of the initial straight line B to C (indicating absence of concrete in the pipe) to the position of the upper wavy line B to C (indicating the aforesaid reduction in resistance due to the arrival of the concrete, the concrete being a relatively good conductor).

The varying widths of the lines traced are due to the adjustment of the **condensing lens and the shutters.** In other words, the widths of the base lines are determined by **focussing** devices and **not** by the **dimensions of the mirrors.** This statement is confirmed by Mr. Ray's testimony. (R. 543.)

Ray says:

> "Q. Can you tell your opinion, or state your opinion as to the reason, if any, why one of those lines is very much wider than the other?
> A. Why, it is apparently a **difference in the focusing** of the light beam."

(R. 544):

> "Q. Now, let me ask you to explain, if you can, why one line is apparently much wider than the other as drawn on those oscillographs?
> A. I should say it was merely a **question of the focusing of the light beam.** In the lower line, which is a much narrower line, the light beam was evidently focused much sharper than in the other case."

The width of the line traced on the oscillograph film also depends on the **rapidity of motion** of the spot of light across the film. For example, observe the exceeding sharpness of the 60 cycle line on the upper

part of Exhibit No. 189. This line having much more rapid motion across the film than either of the lower lines is the sharpest. Also observe how much sharper is the irregular line A to D than either of the base lines at the beginning of the film. The wavy line B to C is much wider than either of the others, due to the **slow rate of motion** across the film arising from the more nearly constant conditions between electrodes B and C than obtained between electrodes A and D.

The plaintiff also erroneously contends (page 79) that the wavy line B to C of oscillogram Exhibit 189 must have started from the upper base line marked A to D in the left end of Exhibit No. 189, because it is apparently wider than the lower base line marked B to C. The optical system of the oscillograph is such that a line considered deflected or elongated from its base may make a wider trace than was traced on the base, as instanced by a beam from any ordinary mirror held in the hand and projected on any angle against a wall. This is the case on the record in Exhibit 189.

The plaintiff further erroneously contends (page 80) that the irregular line marked A to D could not have followed from the upper base line marked A to D because it dropped below this base at several points in the length of the film. Both base lines A to D and B to C were not **zero** lines but represented some **initial deflection,** due to the condition of the inside of the hose between the electrodes. These base lines were obtained between two shots of concrete from the Hackley gun in regu-

lar operation in lining the Melones tunnel. During the interval between shots the interior of the hose was neither clean nor dry; consequently some conductivity existed between electrodes A and D and between electrodes B and C. During the passage of the shot the irregular line A to D shows that there were brief intervals when there was a greater resistance between electrodes A and D than existed before the arrival of the shot.

Attention is called to the obvious fact that the character of the wavy line B to C is entirely different than the character of the irregular line A to D. If the plaintiff's claim that the base line was interchanged was true, the upper wavy line B to C would have been deflected practically the same amount from the upper base as the irregular line A to D is deflected from the lower base. Hence, the element producing line B to C could not have been shunted.

Irrespective of the base line from which the wavy line B to C was deflected, attention is called to the fact that at no time during the entire passage of the shot did this line drop to either base. If the concrete had traveled through the discharge pipe in slugs with air between, line B to C would have dropped substantially to its base. Obviously it did not do this at any time during the entire passage of the shot of concrete.

There is nothing in the slug theory that will in any way account for the difference in the character of the wavy line B to C and the irregular line A to D. The character of the lines on the film can only be explained

as Mr. Wilkins explained them,—that the concrete was passing through the pipe in a substantially constant proportionate mixture of concrete and air with a greater amount of air at the top of the pipe between electrodes A to D than existed at the bottom of the pipe between electrodes B to C.

PLAINTIFF'S SPURIOUS DRAWING, "PLATE FIVE."

Plaintiff resorted in its briefs below to another drawing designated as "Plate Five," which appears again in its brief before this Court opposite page 85.

This "Plate Five" of appellant is deceiving and incorrect, as seen by a mere comparison with the original defendants' oscillogram (Exhibit 189) in evidence. Appellant says (middle of page 85):

> "On Plate Five petitioners illustrate the first seven seconds of the record of Defendants' Exhibit 189 in which the length of the record has been foreshortened by a photographic process from substantially 50 inches down to substantially 8 inches * * *."

Anyone knows that to **foreshorten** even a straight piece of string is to cause it to fold and no longer become straight. In foreshortening a wavy line, naturally you make humps where there were simple curves before, and if it is assumed that this is a record, the original record with the curved lines is so grossly distorted as to be no longer recognizable. Plaintiff-appellant has simply buckled up a crooked line to suit its needs and said it was defendants' curve.

In order to show the crudeness of this attempted imposition on the Court, we have produced here opposite a photostat facsimile of this "Plate Five" of plaintiff's bogus drawing and below it a facsimile of the true seven-second length of defendants' Exhibit 189.

Referring to the drawing of the apparatus (Exhibit 188) and the oscillograph (Exhibit 189) Wilkins says (R. 444):

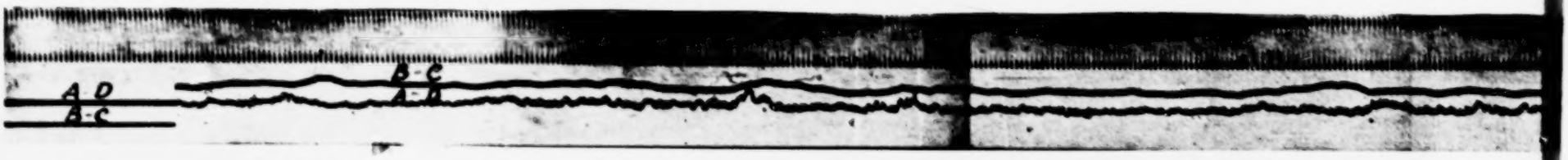
> "A. When the pipe is completely full the deflection from the zero which is indicated at the start would extend nearly across the film. It was a solid concrete, as concrete flows out without any admixture of air. In this, it indicates that the concrete is mixed on the bottom with air to a great enough extent to drop down that deflection about half way. On the top there is much more air that gives it more of a wavy motion and very much less deflection. Such little jumps as are shown in these places indicate that more current would pass through it, and there is more evidence at the back end of the film where the pressure drops somewhat. Such an indication as this indicates that there was more concrete went through between those electrodes at that time.
>
> The whole film indicates that the flow is practically uniform with a mixture of air, which remains the same.
>
> * * * * * * *
>
> A. More solid than at the top."
>
> * * * * * * *

(R. 446):

> "A. The general conclusions were that the concrete flowed through the pipe with a proper supply of air, practically a uniform mixture of air and concrete, somewhat denser at the bottom. That if the air pressure dropped, you could make

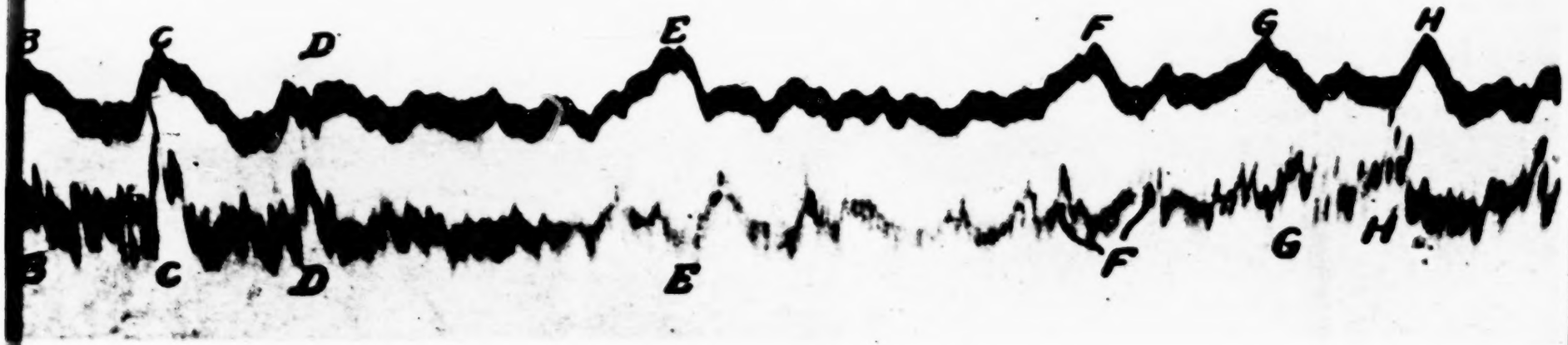
PLATE FIVE

Plaintiff's Deceptive Drawing - Plate Five (Opposite Page 48)



A True Reduction for 7 Seconds of Length of Oscillogram of Exhibit 189.

PLATE FIVE



Plaintiff's Deceptive Drawing - Plate Five (Opposite Page 48)

A True Reduction for 7 Seconds of Length of Oscillogram of Exhibit 189.

it vary somewhat. However, it was still a mixture of air and concrete.

Q. Did you ever encounter any slugs or plugs such as Mr. Ray, plaintiff's expert, has referred to?

A. There were not.

The COURT. **Do you mean that this was a continuous flow of the mixture? I want to know if this was a continuous flow of this mixture?**

* * * * * * *

Q. Indicates what?

A. **That it was a continuous flow** of the mixture of air and concrete."

CONCRETE FLOWED OUT LIKE DISCHARGE FROM A WATER PUMP.

Continuing, Mr. Wilkins testified (R. 446):

"Q. And did you observe the concrete flowing or issuing from the discharge pipe?

A. I did.

Q. And how did that correspond in appearance with your scientific record here?

A. **It corresponds to my mind exactly in that it flows out of the end of the pipe much the same as the discharge from a deep well turbine pump, I would say.**

The COURT. **Well, how is that?**

The WITNESS. **It has a uniform flow without any spurts or dumps and not necessarily solid.**"

On conflicting evidence the Court found in favor of "continuous flow" as against plaintiff's slug theory.

PETERSON CORROBORATES WILKINS.

Mr. Peterson, an eminent engineer in the employ of the Pacific Gas & Electric Company of California corroborated the Wilkins tests, not only in regard to

the specific tests on concrete, in question, but showed that substantially the same electrical method employed by Wilkins was used years earlier by Peterson, only on a more gigantic scale, in ascertaining the rate of flow of subterranean streams. Thus, (R. 451):

> "A. We put down an upper well—a central one and then on the arc of a circle we put three or four lower wells assuming that the water was traveling down a river valley or something of that nature and we decided to explore the rate at which water flowed forty or fifty feet below the ground surface; also the directions; and we placed electrodes, which are metal rods, in these lower wells with wooden insulators around them and we connected up from the casing to these rods —made a connection there to an ammeter and then we put a salt solution in the well, and we determined the time it took to reach the lower wells and also the direction of the flow, and from that information and from samples of materials obtained we could make an estimate of the quantity and direction of the underground flow."

* * * * * * *

(R. 456):

> "Q. Did the saline solution decrease or increase the conductivity of the water?
> A. Increased the conductivity."

A summary of the Wilkins tests indicates:

1. That the flow does not occur in blocks or slugs.

2. That the flow is a mixture of air and concrete, i. e., aeration.

3. That the mixture of air and concrete changes along the pipe.

4. That the mixture of air and concrete at the bottom of the pipe is somewhat more dense than at the top, giving better electrical conductivity.

5. That the average velocity at the beginning of the discharge pipe is over 20 ft. per second.

Contrast Between the Wilkins and Ray Tests.

Wilkins' apparatus is 50 times as sensitive as Ray's, since Wilkins records impulses up to 5000 per sec. against 100 per sec. by Ray's.

Wilkins records:

1. **Position** of material,
2. **Character** of same mixed with more or less air,
3. And **rate of flow.**

Ray records none of these factors, but merely **impacts** resulting from **change of direction** of flow; i. e., the **projectile effect** of concrete, or of stray large rocks in the concrete.

The Wilkins tests are in accord with the testimony of all the witnesses except Ray that the flow of concrete from defendants' apparatus is **continuous** and not intermittent or slug or piston like.

LARKIN AND LEAKE DISPROVE PLAINTIFF'S SLUG THEORY.

If it is desired to pursue the "slug theory" farther, we have only to refer to the depositions of Larkin and of Leake whose inventions are like and preceded McMichael and who sold their inventions and patents to the plaintiff and who each declare flatly against the presence of any "slug action" in blowing concrete. The facts concerning their early experiences have heretofore been successfully suppressed by plaintiff.

The deposition of Mr. Larkin was taken for two special reasons:

(1) To substantiate the facts contained in affidavits made **as far back as** 1909 by Mr. Larkin and his co-inventor, Mr. J. W. Buzzell, in connection with his patent applications above, that they had made their invention, which in all essential features was the McMichael invention, **as early as December,** 1904.

(2) That in the machine they had built and tested in a practical commercial way and which tests were written up and elaborately illustrated with photographs in **"Engineering News"** for **November 25, 1909** (Defendants' Exhibit 71), the operation of **flow and discharge** of the concrete flatly contradicted plaintiff's "slug" theory.

LARKIN, AN ABLE ENGINEER AND A PRIOR INVENTOR, SAYS FLOW CONTINUOUS.

Remembering that Larkin was a hostile witness and admittedly biased in plaintiff's favor by virtue of self interest, he naturally tries to deprecate the success of his own efforts and glorify those of McMichael. But it is not seen why the advantages of the McMichael embodiment would not inhere in the Buzzell and Larkin embodiment, and, conversely, why the disadvantages or troubles, if any of Larkin's, would not necessarily find duplication in McMichael.

LARKIN REFUTES THE SLUG THEORY OF RAY.

Larkin, examined in this case for the first time says (R. 493-94):

"Q. Did the concrete come out as shown in the photograph entitled Fig. 2 in a solid stream or did it issue in slugs or pistons?

A. A certain number of times when conditions were favorable there was a **continuous unbroken discharge of concrete until all the batch** had been shot out of the end of the pipe. Whenever the machine operated it discharged the **whole mass at one time,** and no attempt was ever made to discharge the material in any other way. There were very many trials made at which failure resulted from arching or plugging. In the whole history of this particular type of apparatus the difficulties mentioned were never eliminated and no attempt was ever made to move the concrete except in a **continuous mass,** discharging a complete batch at one time.

Q. Did the **concrete ever come out in slugs or pistons?**

A. **Never.**"

LARKIN'S APPARATUS USED ONLY THE AIR PRESSURE ON TOP OF THE MASS, SHOWING EVEN WITHOUT THE SECONDARY AIR OR SYPHON JET IT WOULD BLOW CONCRETE AND BLOW IT IN A CONTINUOUS MASS.

(R. 494):

"Q. Did you use air pressure on top of the concrete only in the gun or did you also use a supplemental jet?

A. We never at any time used any method other than that of applying air pressure at the top of the mass of concrete in the receiving hopper or drum."

(R. 495):

"We were encouraged by the fact that we did discharge a certain number of batches in a **continuous mass successfully.**"

LEAKE'S EXPERIENCE LIKEWISE DISCREDITED PLAINTIFF'S "SLUG" THEORY.

(R. 591):

"Q. When you applied the air pressure to A, what happened?

A. It just all went up and landed up here.

Q. That is the concrete in the container A?

A. Yes.

Q. How quick was that?

A. **Instantly.**"

(R. 599):

"Q. About how far up was the outlet of the pipe in the Webster Building where you discharged the mixture?

A. That fifth floor? I don't know. I guess about 12-foot stories, about sixty feet.

Q. And about how high up did you succeed in discharging the mixture in New Orleans?

A. That was about thirty feet."

* * * * * * *

"Q. And in both cases it was **practically instantaneous?**

A. Only the Webster it was not concrete.

Q. It was cinders?

A. Yes."

(R. 601):

"Q. How large a pipe did you use down there in New Orleans?

A. I think it was a four inch.

Q. The regular four inch pipe?

A. Yes.

Q. And how much pressure did you use, do you recall?

A. No. I suppose about sixty or——"

And on cross-examination (R. 602):

"XQ. How long did it take for the material to go from the cylinder of chamber A up through the pipe?

A. **Instantaneously.**
XQ. To the discharge outlet?
A. **Instantaneously.**"

SO-CALLED "PATENT EXPERTS" HAVE NO PLACE IN A SIMPLE CASE LIKE THIS.

We cannot believe that the imaginings of the theorist Ray will weigh very heavy with the Court against the affirmative evidence and actual knowledge of practical men of the type, standing and experience as Wilkins, Peterson, Hackley and McCormick.

> "In deciding between contradictory expert testimony, juries should consider the respective reasons, ability, knowledge, and fairness of the experts. * * * And testimony based on experience is more weighty than testimony based on the theoretical consideration." (*Walker on Patents*, Fifth Edition, Section 498, pages 564-565.)

PATENT EXPERTS AS ANCILLARY COUNSELORS.

Defendant here offered no expert on the subject of the patent in suit or on the prior art for the reasons given by Judge Buffington in *Krupp v. Midvale Steel Co.*, 191 Fed. 588, 596 (3 C. C. A.):

> "The nature of their disclosure is all set forth in plain terms in their specifications, and we may here remark that it is only where a court requires the explanation of technical terms or the language of any particular art to enable it to understand a specification that the evidence of those expert in the art is pertinent. The province of such expert testimony is to remove uncertainty where the terms used are obscure, and is not to create uncertainty where the language is plain."

The argument of Mr. Ray, as far as he was permitted to argue the case for the plaintiff and his evident purpose on the stand, forcibly recalls the observation of Judge Coxe in *Steam Gauge Co. v. Man. Mfg. Co.*, 28 Fed. 618, where he said:

> "supplemental though it be by the opinions of those **ancillary counselors called experts,** whose arguments upon the law and the facts terminate in a jurat and are frequently referred to as affidavits."

This objection is voiced also by Judge Learned Hand in *Kohn v. Eimer,* 265 Fed. 902:

> 'When the judge has understood the specifications, he cannot avoid the responsibility of deciding himself all questions of infringement and anticipation, and the testimony of experts upon these issues is inevitably a **burdensome impertinence.**
>
> "Now the question whether the judge needs the assistance of experts to understand the specifications **is for him to decide.** * * * The important point is that **it is he who must determine when he needs the help of experts and when he does not, and that decision, except in the clearest case, we should not be disposed to disturb.** * * * One of the chiefest scandals of the old procedure was the interminable examination of experts, to extract their opinions upon the very issues which the courts alone could decide. The logomachy which resulted from the cross-examination of an expert by the opposing lawyer was arid beyond belief. No one read it, every one was annoyed by it, and some one paid for it." (Boldface ours.)
>
> See also *David v. Harris,* 206 Fed. 902, 904. (2 C. C. A.).

There was no abuse of discretion by Judge Bourquin's refusal to hear argument by the witness Ray

on the contents of patents as simple as those in evidence. Nevertheless Ray has put his argument into plaintiff's brief.

No error was committed by the trial court in preventing Mr. Ray from arguing the prior art patents. The patents are so simple that they speak for themselves. Whether or not the trial judge desired expert evidence in regard to them was a matter within his discretion. Manifestly relieving this Court from the tedium of reading endless pages of expert argument was not an abuse of discretion.

Had the floodgates of expert testimony on these patents been allowed to open, there might easily have been the result noted so picturesquely by Judge Dayton in *Bryce Co. v. Seneca Glass Co.*, 140 Fed. 161, 167, which has become a classic on the subject.

In commenting on plaintiff's claims to a slug action to carry novelty in McMichael over the prior art Judge Bourquin admirably stated the proposition and the answer (R. 615):

> "Plaintiff's contentions as they appear in its brief are that McMichael invented (1) the hopper-bottomed container; (2) application of compressed air to convey concrete; and (3) the method of the lower air to detach portions of the concrete, which alternating with like slugs of air, are driven through the discharge pipe.
>
> "In respect to the first, containers with hopper bottoms to direct the flow of their contents preceded McMichael for time so long, the memory of man runneth not to the contrary.
>
> "In respect to the second, long prior to McMichael were many devices more or less like his, in which the art of compressed air to convey

mobile substances was developed and used. Whether or not it had yet been applied to concrete, to the latter is but a new and analogous use, devoid of novelty or invention.

"The affinity and analogy of concrete to other mobile substances, commonly thus conveyed, was recognized by McMichael himself in his association of it with sand and other granular materials in his original application. His subsequent exclusion of all but concrete of those so associated is suggestive of preparation for litigation to come. To extend the art to concrete when it came into extensive use, not invention, but only common sense, to say nothing of ordinary mechanical skill to be expected in the progress of the art, was required. In principle, it differs none from like extension of the use of a wheelbarrow to convey concrete.

"For a principle, appliance and method applied to substances in general, will naturally embrace any new substance, even as a statute relating to a genus will open to include newly created species.

"The instant case cannot be distinguished in principle from Concrete etc. Co. v. Gomery, 269 U. S. 177, 46 S. Ct. 42, 70 L. Ed. 222, wherein it is held that appliances and method of conveying mobile substances by gravity extended to concrete when it came into use, and a subsequent patent to thus convey concrete is invalid.

"For gravity, substitute compressed air, and that case 'reads on' this."

PRIOR ART.

Further, Judge Bourquin said:

"Moreover, prior to McMichael were patents for appliances and methods to convey concrete by the agency of compressed air. Amongst these

are Smith, 122,498 of 1872; Cannifff, 873,345 of 1906, and McIlvrid, 958,421 of 1905.

"In so far as it is argued that some of these are for grout, and will not function with less liquid concrete, the answer is they can be used for any practical flowable concrete, and they have been. They are of the simplicity of McMichael's, and even average intelligence will perceive their ability to operate successfully."

CONCRETE AND GROUT DIFFERENT ONLY IN DEGREE; BOTH A CONCRETE.

Further Judge Bourquin said:

"The variety of concrete is not material, save in respect to the mere incidentals of pressure and size of container, load, and discharge conduit.

"In any apparatus, including McMichael, the concrete must be flowable in quality, and the pressure in due proportion to the weight and friction of the load ahead of it. To suit these incidentals to circumstances is mechanical, and not invention.

"And this is true, be the container capacity or load discharged in one slug (continuous stream) or in several shorter slugs."

PLAINTIFF'S SLUG THEORY.

Continuing Judge Bourquin said:

"Adverting to the third of plaintiff's contentions, the first observation is that the slug theory is not proven and is untenable.

"With 100 pounds of air from the primary upper air pipe behind it, the concrete stands not on the order of its going, but goes at once. And through the discharge pipe 'with great rapidity and speed.'

"In these circumstances, the upper air does not halt until the lower air has neatly cut off and removed a slug of concrete, nor does the lower air, of like pressure from the common reservoir, halt until within the field of its activity has been projected sufficient concrete to form any slug.

"In the nature of things, the patent now stipulating what the application originally did not, viz., simultaneous and constant application of both upper and lower air, the lower air can but some disintegrate and aerate the mass of concrete as it rushes by, and thereby lubricate, lighten and assist its flow through the conduit. The lower air but joins and flows in the same direction and with the stream of concrete.

"It may be that, if the upper and lower air were alternately applied, some *quasi* slug action would follow, akin to the action of Saunders' 'air-lift pump,' patent 597,023 of 1896, but not when simultaneously applied as here."

PLAINTIFF'S THEORY DOES VIOLENCE TO THE LAWS OF NATURE.

Judge Bourquin speaking from the record and from his very considerable experience with things mechanical, finds as a fact:

"Taking McMichael as it is, to expect or secure movement of the concrete in alternate slugs of concrete and air would do violence to the laws of Nature and confound reason. It cannot be done."

ON CONFLICT OF EVIDENCE DEFENDANTS' TESTIMONY IS CREDIBLE AND PLAINTIFF'S INCREDIBLE.

Concluding this branch of the case the learned Judge found:

"Moreover, the proof is clear, by plaintiff's witnesses as by defendants', and some who are interested in plaintiff, that the concrete discharges in a continuous aerated or mixed stream of concrete and air, and not at all in any slug formation.

"As between Wilkin's test, discrediting the slug theory, and Ray's supporting it, the former's is calculated to more nearly approach accuracy."

The Ninth Circuit Appellate Court said (pp. 840-841):

"There was no suggestion of a slug theory in the original application of McMichael, * * *

"The slug theory was obviously adopted, from expressions found in Leake's application, * * *

"It is stated in the brief of appellant's counsel that the appellee's engineer, Hackley, admitted that the appellant's apparatus 'operates on the slug principle.' We do not so understand Hackley's testimony.

* * * * * * *

"Brock, a witness for the appellant, testified that in the Skagit tunnel the concrete, when it came out through the 8-inch discharge pipe, 'flowed down gently like over both sides.' And such was the testimony of all the witnesses who observed the operation of the device in the Skagit tunnel.

"In fact, there is but one witness for the slug theory, Ray, a consulting engineer and patent expert. * * * The court below credited the testimony of Wilkins as against Ray, and we think the court was supported by the overwhelming weight of the testimony.

"We think that the slug theory, when all is said, has no bearing upon the merits of the present controversy, for, whether or not the appellant's apparatus operated to deliver concrete in

slugs or sections, it is very clear that the Hackley apparatus operates in delivering a constant stream of concrete, interrupted only so far as it is interfered with by the air which accompanies it through the discharge pipe."

PLAINTIFF'S SO-CALLED ARCH BREAKING NOZZLE.

In the later stages of this litigation and after the *Storrie* case reached the Circuit Court of Appeals, the plaintiff shifted its position on the "slug theory"; practically abandoning it and fell back on the so-called "arch breaking nozzle."

ARCH BREAKING NOZZLE.

Plaintiff has abandoned one line of theory after another until it has fallen back on the so-called "arch breaking nozzle." In the New York litigation it was the "slug" theory that constituted the novelty. Plaintiff emphasized in those cases that the concrete operated in slugs and that McMichael was the first to shoot concrete because McMichael discovered the slug theory which made it possible to shoot concrete! In other words, the claim of plaintiff has always been, until recently that the McMichael invention resided in the ability to convey concrete through a conduit by compressed air and to do that **with or without** the so-called "arch breaking nozzle."

But, there was nothing new in such a nozzle so placed whether it was to "break arches" or to act, as

it necessarily does wherever used, as a booster or secondary jet to the air pressure on top of the mass to be moved.

The idea of two air forces, one acting on the body to be moved and the other in the conduit on the substance in movement, is notoriously old in the art and long before McMichael.

THE "ARCH BREAKING" JETS OF DUCKHAM & KOLSCHE.

We only need to mention two outstanding references relied on by the trial and appellate Courts and fully discussed post: to-wit, the Kolsche patent and the Duckham patents. (For Kolsche see photostat enlargement, and appendix to this Brief.)

To quote from the translation of Kosche (pp. 183-4, Book of Exhibits):

> "The receptacle **b** is filled with the material through opening **k**, the cover of the latter is closed * * * the main air supply valve in front of **a** and valve **g** opened. The latter is done, so that the same air pressure prevails above the mass to be moved as below it, and so that it will drop unobstructed into the air pipe **d**. * * * When the particles drop they are engaged in pipe **d** by the air current and driven through the entire passage."

Kolsche has certainly not only the equivalent of plaintiff's "arch breaking nozzle," but has disposed in just the same position as plaintiff shows it in its commercial machine and as presented in the photographs of the Ransome-Canniff (or the Ransome-McMichael)

gun reproduced at pages 89, 90 and 91, Book of Exhibits. The only difference in the world is that the booster jet of the Ransome-Canniff (or Ransome-McMichael) is that in the plaintiff's so-called commercial machine, this pipe is shown a little smaller than is the pipe **d** of Kolsche.

This "arch breaking nozzle" idea is proving a back-breaking burden to plaintiff, particularly after illustrating opposite page 76 of its brief Duckham and Kolsche and then having the temerity to add (top, page 76): "No one of the several prior art machines in the lower row comprises a velocity nozzle!" Aside from Kolsche and Duckham's disclosures we have only to call attention to numerous examples of the so-called velocity nozzle in the prior art as for example: Trewent (British); nozzle C (p. 180, Book of Exhibits); Whisler, 669,192, March 5, 1901; jets 'C' (p. 578, same); Sickels, 99,360, Feb. 1, 1870; pipe p (p. 614, same); Rix & Donahoo, 635,270, Oct. 17, 1899; nozzle 35 (p. 618, same).

The Duckham patents discussed later herein appear at pages 598-611, inclusive, Book of Exhibits. The article, on Duckham's use of the invention in his engineering practice, from the Minutes of Proceedings of the Institute of Civil Engineers for 1886 (Defendant's Exhibit 29) appears at pages 185-189, Book of Exhibits.

Plaintiff's attempt to explain away the force and effect not only of the Duckham disclosures but of the Duckham definite practice as outlined in the last mentioned article above, betokens a captious effort to

confuse and becloud the issue. Duckham says in his first patent (page 601, Book of Exhibits):

> "I prefer to construct the tanks of a form **favoring the flow of the mud or 'spoil' to the outlet, and in order to prevent a deposit of mud in the tank so thick that it would not run** freely to the outlet and would therefore remain in the tank, **I prefer to inject compressed air** (with or without an admixture of water) * * * **through a number of nozzles at the bottom** of the tank, said **nozzles being pointed towards the outlet.** By this means the particles are prevented from settling, and are kept in suspension until the whole is expelled from the tank. **Compressed air may moreover be admitted into the discharge pipe with the same object.**"

That description should be definite enough; but note in addition what Mr. Duckham stated at the meeting of the Civil Engineers, as shown by the report at pages 187-8, Book of Exhibits: that he actually used these air jets by reason of necessity of keeping the discharge outlet open. That is all that plaintiff means by its so-called "arch breaking nozzle."

Duckham's experience in this regard, as Engineer to the Millwall Dock Co., is thus stated (page 188, Book of Exhibits):

> "From experiments made with one of the first apparatus constructed on the above principle, the Author found that, with **clay or stiff mud,** if the nozzles of the air-injection pipes were too small, the compressed-air, instead of driving out the material, simply pierced holes through it, escaping through the discharge pipe, and carrying along with it all the liquid and thin material in the tanks. **This defect was easily rectified by rearranging and increasing the size of the injection nozzles, and the apparatus now gives most satisfactory results.**"

If mud and "spoil" (and spoil is analogous to concrete particularly if it contains clay and rocks) will pack around the outlet; and if these compressed air nozzles are necessary to break this obstruction, why isn't that the same thing in exactly the same relation and for the same purpose as plaintiff's so-called "arch breaking nozzle" to break an obstruction?

Plaintiff's argument is an endless repetition of its claim to having discovered its one single feature of the so-called "arch breaking nozzle," but which only emphasizes the poverty of novelty in McMichael.

THE LAW OF THE CASE.

The leading case on the modern history of conveying concrete and analogous substances and to which we have referred is:

Concrete Appliances Co. v. Gomery, 269 U. S. 177; 70 L. Ed. 222;
Same case, 291 Fed. 486 (3 C. C. A.)

All the Judges of the Ninth Circuit accepted this *Gomery* case as controlling; Judge Bourquin saying (R. 616):

> "The instant case cannot be distinguished in principle from *Concrete etc. Co. v. Gomery*, 269 U. S. 177, 465 Sup. Ct. 42, 70 L. Ed. 222, wherein it is held that appliances and method of conveying mobile substances by gravity extended to concrete when it came into use, and a subsequent patent to thus convey concrete is invalid.
>
> "For gravity, substitute compressed air, and that case reads on this."

The Appellate Court gave its stamp of approval as follows (27 Fed. (2d) 838, 839):

> "It is true that Duckham* was engaged in moving a material quite different from concrete, but that fact is not of importance on a question of anticipation. Concrete Appliances Co. v. Gomery, 269 U. S. 177, 46 S. Ct. 42, 70 L. Ed. 222."

THE DEFENSES.

Prior Invention by Leake:

Sufficient has been said to show conclusively that Leake was prior in time to McMichael and had reduced the invention to practice long before McMichael came into the field.

The invention was obviously a simple one. To try it was to prove it. To prove it was a reduction to practice. Reduction to practice was the completed act of invention.

"Test" as Proof of Reduction to Practice.

While obviously the Leake invention comes in this general class of simple inventions, reduction to practice is fortified by actual test made by Leake in 1905.

The date of the actual **test** of a machine in any event determines the actual date of reduction to practice. (*Smith v. Warnock*, 271 Fed. 556.)

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* The Duckham patents and publications (post) had to do with conveying "dredge spoil" which is a material not unlike concrete in consistency and other physical characteristics. As Mr. Peterson, a practical engineer of large experience, testified (R. 454):

> "Q. **What material has about the same handling characteristics as concrete?**
>
> A. I would say a sticky mud containing considerable clay, commonly called muck, would be quite similar with a moderate amount of moisture and the similarity would be even greater with the rock embedded in that, commonly called **spoil.**"

This Leake did in New Orleans in 1905.

Mr. Leake's work in 1905 with concrete on the Stuyvesant Docks at New Orleans (although not extensive) and again in Chicago in 1907 in blowing cinders to the loft of a four or five story building, shows the invention to have been simplicity itself.

Plaintiff's brief on petition for writ of certiorari sought to discredit Leake's testimony, despite the fact that it was evident Leake did everything in his power in this suit to protect his assignee, the plaintiff, by pleading lack of definite recollection, by evasion, and everything but equivocation. Leake is a high-grade, alert, honest man who would not lie even for the plaintiff. Plaintiff-appellant is simply seeking to discredit the testimony now educed which it has heretofore succeeded in suppressing. But "murder will out."

If plaintiff had any reason to doubt Leake's testimony, it should have sought to impeach him on the trial by competent evidence. This plaintiff did not attempt to do because it knew that what Leake said was true and has known it was true since 1909. It comes with bad grace on plaintiff's part to attack their **ally** now.

Any "vagueness" in Leake's testimony is probably due to influence brought to bear on Leake by plaintiff to "forget it" and after he had testified quite fully only a few months previously in the *Great Western* case, and prior to which time he had most fully and completely discussed the subject-matter of his deposition with Mr. Abbett, of Mr. Townsend's office, at San Diego.

As to plaintiff's criticism of Leake by reason of the Leake sketch (Exh. 127), it is misleading on plaintiff's part to seek to give the impression that all Leake did or has to show was this sketch.

Remembering the Leake interference, the buying off of Leake by plaintiff and the proofs that Leake's invention antedated McMichael nevertheless we find plaintiff pretending for priority in McMichael.

It is also to be remembered that Leake came into the Patent Office within a very few months after McMichael, with the same invention that McMichael was claiming, including both the pressure on top of the mass and the so-called "arch breaking" jet. (See the pipes 88 and nozzles 89 of Leake patent, Fig. 3, page 456, Book of Exhibits.)

Whatever plaintiff may say here, it is an indisputable fact that Leake and McMichael being **in interference** were both claiming the **same invention.** All that the drawing (Exhibit 127) was for was to test Leake's recollection and to force him to show, on the stand, despite his reluctance to testify against his assignee, that his recollection in 1927 accorded with the actual facts of 1905. What the plaintiff has failed to tell the Court is the circumstances under which the drawing was made.

The interference was declared shortly after, and the preliminary statements of Leake and McMichael set out the facts as to what each had done.

No other Court in any litigation over the McMichael patent, until this trial, had ever heard of the Leake patent or the Leake invention and how the plaintiff

had bought up Leake. Until the present case, the true facts never came to light in regard to the relative priorities between Leake and McMichael.

Leake was a hostile witness and reluctant to testify. Without his testimony his preliminary statement meant nothing. It was merely a lead which defendant followed up and forced the truth from Leake; and to test the truth of the facts in his preliminary statement, with the object of asking him independently of his patent drawings, Leake was requested to make a sketch while on the stand of what his original device looked like. Leake is not a draughtsman; he is a business man and railroad contractor, but his crude free-hand sketch makes it clear to anyone what the New Orleans structure looked like and how it worked. Whether it was a so-called "arch breaking nozzle" or not is immaterial. The device did shoot concrete and consituted a "reduction to practice." It was prior to McMichael and it anticipates McMichael.

All the cases cited by plaintiff on question of proof, concern witnesses **biased in favor of the party for whom he is testifying, and not to a case like that of Mr. Leake who was manifestly and confessedly biased in favor of the opposite party.**

The fact that Leake is the only witness to the facts testified by him does not render that testimony entitled to less weight than accorded to it by the Honorable Trial Judge who said:

> "For despite Leake's reluctance to testify against his assignee, the plaintiff, the evidence in quality and quantity inspires confidence and con-

strains conviction of the truth of the fact and beyond reasonable doubt." (R. p. 619).

The Ninth Circuit Appellate Court gave ample consideration and authority for the same view.

> **"The rule as to corroboration is one of caution and discretion, and is not a statutory provision."**
>
> *Armstrong v. DeForest*, 280 Fed. 584, 591 (2 C. C. A.).

That Court further said (p. 590):

> "There is no reason to doubt the testimony of the patentee as to the date of his inventive thought. While it is true that uncorroborated testimony of an inventor is to be accepted with caution (Clark Thread Co. v. Williamantic Linen Co., 140 U. S. 481, 11 Sup. Ct. 846, 35 L. Ed. 521), yet there is no rule of law that requires the rejection of the uncorroborated testimony of an inventor as to the date of his conception. The court must be satisfied as to the fact of demonstration and that the conception was complete."

An instructive case on this topic is *Buser v. Novelty Co.*, 151 Fed. 478 (6 C. C. A.) before Judges Lurton, Severens and Cochran. At page 492, after quoting Mr. Justice Swayne in *Coffin v. Ogden*, 18 Wall. 120, 21 L. Ed. 821, the Court said (all boldface ours):

> "If, however, the machine or other thing is complete, and capable of producing the result sought to be accomplished, it has passed the experimental stage and becomes an invention; and, in order that it may constitute an anticipation, it is immaterial how well it becomes known or how much it is used. Mr. Justice Swayne in the same case said:
>
> **" 'The prior knowledge and use by a single person is sufficient.** The number is immaterial.'

"In the case of Reed v. Cutter, Fed. Cas. No. 11,645, Mr. Justice Story said:

"'If the invention is perfected and put into actual use by the first and original inventor, it is of no consequence whether the invention is extensively known or used, or whether the knowledge or use thereof is limited to a few persons **or even to the first inventor.'**

"Walker on Patents, Section 71, says:

"'Novelty is negatived by prior knowledge and use in this country **by even a single person** of the thing patented. This rule applies even to cases where that knowledge and use were purposely kept secret; and it applies, no matter how limited that use may have been.'

"Indeed, it has been held that if the alleged invention is complete, and capable of producing the results sought to be accomplished, though it may never have been used, it is an invention and an anticipation. In the case of Stitt v. Easton R. Co., (C. C.) 22 Fed. 649, Judge Colt said:

"'If the constitution of the prior thing of itself demonstrates that it is within the principle of the patent, then, perhaps, no use need be established; for it might be said to prove itself. **It is not necessary that the prior invention should have been actually used for the purpose contemplated, but it must have been capable of such use.'**"

A recent case where a single witness invalidated a patent is *Mueller Co. v. Zeregas Sons*, 12 Fed. (2d) 517 (2 C. C. A.). In briefly disposing of the question the Court said (p. 518):

"The question of invention as between Mueller and Wild is really only one of veracity. There are no presumptions or artificial rules regulating such an investigation, and **the evidence of one witness may be sufficient.** Tompkins Co. v. N. Y., etc., Co., 159 F. 133, 86 C. C. A. 323. We per-

ceive no reason to discuss this question further, and are satisfied with the decision of the court below."

In *Snead & Co. Iron Works v. Behn*, 4 Fed. (2d) 942, the uncorroborated testimony of the brother of the deceased inventor was accepted as sufficient to establish prior invention; the Court saying (p. 943):

> "But where, as here, a party not only has disclosed the result to be achieved, but has definitely and fully disclosed the means for accomplishing that result, **the only question for determination is whether the testimony of the witness to whom he made the disclosure meets the usual test as to credibility.** In this case, Mr. Angus Macdonald is **a witness of much more than average intelligence, a man of affairs, and, so far as this record discloses, of unimpeachable character.** Speaking of his testimony, the Board said: 'The testimony stands unimpeached in any particular, and there is nothing in any way to cast suspicion or doubt upon its truthfulness. We are therefore convinced that disclosure of the invention at least prior to September 27, 1919, the date on which the letter demanding a conference for the settlement of differences with the Thermoid Company was written, is reasonably established.'"

In *Mayer v. Mafschler*, 248 Fed. 911, 914, the Court said:

> "Certainty beyond reasonable doubt is reached by **quality** of evidence, and much depends on the nature of the thing sworn to. **One witness may suffice** (Tompkins v. N. Y. Woven Wire, etc. Co., 159 Fed. 133, 86 C. C. A. 323) if the surrounding circumstances are confirmatory; * * *"

In *Pennsylvania Steel Co. v. Pettibone, Mulliken & Co.*, 141 Fed. 95, the Circuit Court of Appeals for

the Third Circuit reversed the lower Court who applied too rigid a test to the testimony of a single witness, the upper Court finding the testimony credible, not contradicted and dismissed the bill. The Court said (p. 100):

> "The testimony is not incredible. It was not contradicted. **The witness who gave it was not impeached.** It appears not to have been doubted that the stands he mentioned had in fact been made and used; but, because the learned judge was 'not convinced that the witness was certain as to his dates,' this evidence was wholly disregarded. We, however, are of opinion that it was entitled to consideration, and that it should have been accepted as showing, at least, that upon no admissible construction of the patent in suit could the charge that the appellant's switch-stand infringed it be sustained. Mr. Parsons was the superintendent of the defendant company, but **the story he told was inherently probable, and we find nothing in this record which would justify a suspicion that he did not intend to testify candidly;** and, while it is undoubtedly true that evidence of prior use should be clear and convincing, we see no reason to doubt that he was, as he said he was, enabled to fix the times when the stands he described were made, by relation to the happening of the other events to which he referred, and about which it is extremely unlikely he could have been mistaken."

See also *Westinghouse v. Stanley*, 133 Fed. 167, 178.

Since Leake's and McMichael's applications were copending, the instant case is analogous with respect to measure of proof with the facts of *Wilson & Willard Co. v. Bole*, 227 Fed. 607, 610.

This Honorable Court recently in *Corona Cord Tire Co. v. Dovan Chem. Corporation* (decided April 9,

1928), 276 U. S. 358; 72 L. Ed. 610, held that the uncorroborated testimony of one witness was sufficient to invalidate the product claims of the patent there in suit.

There, speaking of this single witness, the Court said:

> "He is wholly disinterested pecuniarily in the result of this case. The fact that he is the only witness is not fatal or any reason for denying its weight in connection with other circumstances. Reed v. Cutter, 1 Story, 590, Fed. Cas. No. 11,645, 20 Fed. Cas., 435; Coffin v. Ogden, 18 Wall, 120; Egbert v. Lippmann, 104 U. S. 333."

PRIOR INVENTION BY BUZZELL AND LARKIN.

BUZZELL AND LARKIN PATENT 894,813, AUGUST 4, 1908. (Defendants' Exhibit 150, p. 549 Exh. Book.) (APPLICATION FILED JUNE 13, 1907.)

Although this patent was applied for and issued subsequent to McMichael's application, but long prior to McMichael's issued date, and although the Buzzell and Larkin patent **has expired** and is public property, yet **Buzzell and Larkin are shown by the Patent Office record and by Larkin's deposition to have been the prior inventors of what McMichael lays claim to.** That this claim of priority was recognized as having substance is shown by the fact that **plaintiff** obtained **a license** from Buzzell and Larkin and has paid substantial royalties to Larkin and his associates.

Mr. Larkin identified two sketches (Exhibits 70 and 70-A respectively) dated **October 14, 1904,** and **December, 1906.**

(R. 478):

"The originals were made October 14, 1904. I note the date on the sketch marked Exhibit B is December, 1906, in my handwriting. It is to be noted that the 1904 sketches are concerned mainly with mathematical computation, while the 1906 sketches show the proposed form of the conveyor apparatus. One original sketch was made in October, 1904, the other original was made in December, 1906."

(R. 482-483):

"The original sketches were lost as previously described in this testimony, but the tracing made from memory of these original sketches have been lost between the files of Emery & Booth, J. W. Buzzell and myself. It would be difficult to make any satisfactory guess. It should be kept in mind that all this took place nearly twenty years back. There is introduced in evidence as Defendant's Exhibits 70 and 70a the sketches, Exhibit A and Exhibit B, dated respectively October 14, 1904, and December, 1906."

(R. 483-84):

"Q. At the time you made the copies of the original sketches for filing in the Patent Office how did you fix the dates of October 14, 1904, and December, 1906, respectively?

A. I fixed these dates by consulting my diary, of which I have a series for some thirty-four years, since 1893."

He identifies an affidavit which he made in 1909-1910 for the Patent Office to establish priority and declared the facts therein stated to be true and correct; approved and accepted as such by plaintiff.

The affidavit reads as follows (R. 487-88):

"WILLIAM H. LARKIN, JR.,

being duly sworn, deposes and states as follows:

I am the William H. Larkin, Jr., who filed the above entitled application for patent conjointly with Josiah W. Buzzell on January 25, 1909.

Prior to the 29th day of October, 1909, the idea occurred to me in the course of my duties that concrete or like segregated rock bearing, cementitious material might be conveyed by fluid pressure. Shortly thereafter and **prior to October 29, 1906,** I discussed this idea with the said Josiah W. Buzzell at South Boston, Mass., and as the result of said discussion **we jointly invented and developed the method of conveying concrete and like cementitious** material disclosed in the above entitled application. As a result of said discussion, I made in the United States sketches on or before October 14, 1904, illustrative of and disclosing the said invention and means whereby the same could be carried out. Blue prints of said sketches were attached to my previous affidavit filed in this case and executed about August 27, 1909, and marked 'Exhibit A.' Said original sketches I am retaining in my possession for future use in possible litigation or interference.

Prior to October 29, 1906, and in conjunction with the said Buzzell, I reduced to practice the said invention in the United States by conveying concrete by fluid pressure in the United States in the manner described in my above entitled application and as disclosed in the amendment accompanying the supplemental oath executed on even date herewith."

This is clear proof of priority of invention against the subsequent efforts of McMichael of everything disclosed in the Buzzell and Larkin patent which was filed June 13, 1907, only five months after McMichael.

The plaintiff's interest in the Buzzell and Larkin patent is shown to have been acquired as late as 1920 and to have been substantial (R. 498).

THE RANSOME COMPANY AND THE PLAINTIFF IN A COMBINE TO CORRAL ALL PATENTS IF ONLY FOR THEIR NUISANCE VALUE.

Continuing Mr. Larkin testified (R. 502):

> "The Ransome Company has certain patents of its own in this field. They and the Concrete Mixing & Conveying Company have a mutual agreement by which they share the use of each other's patents and a certain arrangement of the profits, the exact facts of which I do not recollect."

(R. 503):

> "Q. What were the reasons inducing the Pneumatic Concrete Conveyor Company to grant a license to the plaintiff in 1920?
>
> A. The reason was largely based on the **history of the apparatus as a whole.**"

(R. 504):

> "The plaintiff company believed that it would be to their advantage to consolidate all the patents in this field and particularly the Buzzell-Larkin patents, not so much because of their value as patents but because of the advertising that they had received and because of the fact that both Buzzell and Larkin had been long known in the engineering field."

(R. 505):

> "At the time the license was granted to the Concrete Mixing & Conveying Company we believed that the years of development work that we had performed and the history of our experi-

ments were of more than a little value to that company. The Concrete Mixing & Conveying Company of its part was entirely conversant with the history of the Pneumatic Concrete Conveyor Company's apparatus and method. They were more than pleased to absorb the company in the way they did for the sake of the advertising value of the older concern and to obtain the association, engineering advice and assistance of Messrs. Buzzell and Larkin."

NUISANCE VALUE OF McMICHAEL AND OF LARKIN.

(R. 506-7):

"Q. What value had these Buzzell and Larkin patents 894,813 and 951,754 at the time when the license was granted by the Pneumatic Concrete Conveyer Company to the Concrete Mixing & Conveying Company, if any?

A. It was understood at the time that no value resided in the patents themselves but that the engineering experience of Buzzell and Larkin in this field was an asset.

Q. Did you consider that the Buzzell and Larkin patents **had only a nuisance value?**

A. No, **except it was the policy of the Chicago company to control any and all existing patents** in the field.

Q. Your sympathies, Mr. Larkin, are entirely with the plaintiff in this litigation are they not?

A. Why **practicallly it could not be otherwise because if the plaintiff loses we personally lose.**"

NEITHER McMICHAEL, NOR LEAKE, FIRST IN THE FIELD.

Judge Bourquin, after finding that Leake was as a matter of fact, prior to McMichael, further held in favor of defendant's contention that neither Leake

nor McMichael could rightly lay claim to being the originator of the thing claimed and patented. Judge Bourquin says (R. 619):

> "Neither of them, however, is inventor of the thing. Before them, it was old in the art."

PRIOR USES AND PRIOR PUBLICATIONS, PATENTS, ETC.*

At the time McMichael applied for his patent in January, 1907, compressed air had been employed to convey innumerable substances including:

> CONCRETE: (Smith 1872 patent—Defendants' Exhibit 141—and Smith Machine Exhibit 186; McIlvrid, Moir, Leake, Buzzell and Larkin).
>
> GROUT, i. e., Liquid Concrete: (Camniff, McIlvrid, McCormick and Goldie).
>
> DREDGE SPOIL: Duckham British Patents of 1875 and 1885—Exhibits 157 and 158 (Enlargements) and New York Exhibits 29, 30 and 32 descriptive thereof; Hussey Patents of 1894 and 1895—Exhibits 169 and 170 (See enlargements of drawings), also Miami, Florida, witnesses and New York Exhibits 121, 124, 125 descriptive thereof.
>
> GRAIN: Duckham's appliances at the Millwall Docks, London (1896)—New York Exhibits 30 and 32.

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*As a Patent Case this is a somewhat unusual one in the added and unnecessary burdens and expenses laid on defendant by the refusal of plaintiff to stipulate such ordinary matters as the use of uncertified printed patent copies; by refusing to admit dates of publication of scientific papers and publications (see defendant's demand under Rule 58) and, therefore, requiring the attendance of the witness Rowell, Librarian Emeritus of the University of California at considerable and otherwise unnecessary expense to defendant; and by refusing to stipulate the use of depositions previously taken in behalf of the similarly placed defendants in the copending San Francisco, Great Western Power suit, and the Boston, Stone & Webster suit—simply to enable the plaintiff's attorney as they naively said to take "another crack" at some of the witnesses.

SAND AND WATER: Sulphur, La., and Crowley, La., witnesses, Ivens at New Orleans, La., Saunders "Compressed Air Information" (1903), identified and of which the Court may take judicial notice.

OIL: Same witnesses—same publication.

MIXING AND EXCAVATING: Caisson work: Sickles patent of 1870 Exhibit 159 (Enlargement); Rix & Donahoo patent of 1899 (Exhibit 160); Knights Mechanical Dictionary, 1873 (New York Exhibit 80).

SEWAGE: New York Exhibit 27.

MOULTEN SULPHUR: Louisiana witnesses, particularly Keever and Maxwell at Sulphur, La.: Frasch patents (Exhibits 155 and 156).

SAND BLAST: Kolsche German Patent No. 18,394 of 1882 (Exhibit 168) (see Enlargement). (This is almost a duplicate of the McMichael Apparatus).

WATERS: Pohle Patent (Exhibit 152); Saunders (Exhibit 153); Frizell (Exhibit 163); Harris (Exhibits 164-165).

INTERCHANGEABLE SAND BLAST AND WATER LIFT: Butler Patent of 1900 (Exhibit 167) is a good illustration of the **interchangeable** character of these devices. Butler says:

"The particular sand-pump which I have invented could, however, be used for elevating water or other substances, as will be hereinafter described."

PNEUMATIC PAINTING AND WHITEWASHING: Church Patent of 1892 (Exhibit 161); Saunders (1903) pp. 846-862; Alliance Securities Co. v. Roman Paint Co., supra.

ANTIQUITY OF THE USE OF AIR FOR CONVEYING.

Numerous other instances are disclosed in the various publications of conveying all sorts of things by

compressed air; e. g., **coal, mine tailings, cyanide concentrates, paper pulp, sugar house products, acids, brine from salt mines, hot and cold chemicals, injecting ballast on railroads, solidifying quicksands and foundations by cement injections, draining swamps, etc.**

THE RIGHT OF THE PUBLIC TO WHATEVER HAS GONE BEFORE.

"* * * where the public has acquired in any way the right to use a machine or device for a particular purpose, it has the right to use it for all the like purposes to which it can be applied, and no one can take out a patent to cover the application of the device to a similar purpose. Blake v. San Francisco, 113 U. S. 679; L. Ed. 1070, 1072.

"The inventor of a machine is entitled to all the uses to which it can be put, no matter whether he had conceived the idea of the use or not. * * * Here the patent having expired, all the uses to which the machine can be put are free to the public." (*Gibbon v. Loewer*, 79 Fed. 325, 327, 3 C. C. A.)

This miscellany of Pneumatic Conveying apparatuses certainly must be taken in account in determining whether McMichael invented anything. It is inconceivable that the Patent Office would have allowed the McMichael application to mature into a patent if the prior art here in evidence had been before the Examiner while the McMichael application was pending.

Lining tunnels with concrete by various mechanical appliances was notoriously old before McMichael as

seen by the Patent Office records instanced by the following patents appearing in the Exhibit Book: Tucker, 820,747, May 15, 1906 (p. 526); Goodridge, 317,337, May 5, 1885 (p. 492); Williams & Brown, 829,903, Aug. 28, 1903 (p. 534). While none of these patents employed pneumatic means for conveying the concrete, the patents to which we will refer, do, and constitute a full anticipation of McMichael. To use the Smith, McIlvrid, Canniff or Duckham inventions to deposit concrete behind the tunnel forms of Tucker or Goodridge or Williams & Brown, certainly would not have been invention.

The present case falls squarely within the doctrine laid down by the *Gomery* case, supra.

See also the *Spot Welder* case, 265 U. S. 445, 68 L. Ed. 1098 where this Honorable Court found that the prior development in "butt" welding, electric "riveting," "lap" welding, and "projection" welding left nothing patentable in Harmatta's "spot" welding patent.

SMITH PATENT NO. 122,498, DATED JANUARY 2, 1872.
(Exhibit 141.)

This patent was not in the *Ulen* case. It was introduced in the *Powers-Kennedy* case **but apparently without test or explanation and with only the patent description to guide the Court.** The majority opinion of the Appellate Court in that case dismissed Smith with the observation:

> "While this machine discloses the idea of forcing concrete through a pipe by compressed air,

whether it was practically operable may well be doubted."

The evidence in the *Storrie* case regarding this patent is quite to the contrary and shows that the Honorable Judges of the Circuit Court of Appeals for the Second Circuit had not been given sufficient facts on which to base a correct estimate of the Smith machine.

Smith an Entirely Practical Machine.

This is an apparatus and method of **conveying concrete by compressed air** for street paving.

A Smith machine is in evidence as Exhibit 186. It was on this machine that tests of conveying concrete were successfully performed in San Francisco on Wednesday, September 7, 1927; and, **to witness such tests, the plaintiff and its attorneys were formally invited.** For some unexplained reason they declined or failed to accept the invitation. This machine showed itself and shows for itself as capable as McMichael of conveying concrete by compressed air. The photographs of the Smith machine (Exhibits 184 and 185) show the set-up; and the prints from the movie film (Exhibits 190-191-192) show the nature of the discharge and that this discharge is **the same, whether water, grout or concrete!**

Defendants' Tests of Smith & Canniff.

To take these tests out of the category of **ex parte** experiments and to give them a public, official character, an invitation and notice was extended to, and served upon, plaintiff and its several attorneys in both San Francisco and Seattle (R. 211).

THE SMITH PATENT.

Before considering these tests we will see what the Smith patent actually teaches. The patentee says:

> "The object of this invention is to provide for the public an improved street-pavement, an improved method of laying the same, and improved means for carrying said method into practice.
>
> A distinctive feature in my method of laying pavements consists in manufacturing the concrete **composition in a fluid or semi-fluid state, so that it will flow through pipes,** and **in conveying it from the mixing machine to the spot where it is to be laid, in pipes or conduits and flowing it from the pipes upon the ground,** or upon a suitable foundation, where it immediately sets and forms the pavement, its surface being molded to any desired conformation by means of surface molds."

CROSS REFERENCE TO SMITH'S CONTEMPORANEOUS PATENT 122,497 (Defendants' Exhibit 140 for Identification) ON FORMULA FOR CONCRETE.

> "In thus constructing a pavement I preferably **use the composition described in an application for Letters Patent of the United States filed by me contemporaneously herewith;** but in my improved process or method of laying pavements as herein described, I do not confine myself to that particular composition whatever, now known or hereafter to be discovered, the properties of which adapt it to be conveyed and laid while in a fluid state."

Smith Patent No. 122,497 of January 2, 1872 (Defendant's Exhibit 140 for identification, p. 481 Book of Exhibits), is a full and complete disclosure of the formula for and uses of modern **wet concrete.** Smith

in this patent makes cross-reference to his patent 122,498 (p. 1, lines 8-29) as follows:

"In an application filed by me contemporaneously herewith for letters patent of the United States I have described certain improved machinery and appliances for manufacturing and mixing concretes for pavements, buildings, and other purposes, conveying it from the machine to the place where it is to be laid or used, and suitably laying or casting it in molds or otherwise to the required form. **By reference to the specification filed therewith it will appear that such apparatus is specially adapted to the manufacture and use of a liquid or semi-liquid concrete composition which can be conveyed through pipes and cast in molds.** No concrete composition has ever been brought into public use for the purposes referred to which is capable of being thus manipulated; **nor has it been deemed practicable to attempt to invent a composition sufficiently liquid to flow freely through pipes and yet able to set quickly upon reaching its destination, so as to form in a very short time a solid mass of artificial stone.**

(Lines 37-83.) " * * * my invention consists in a composition prepared substantially as hereinafter described, so as to be capable of use in a fluid or **semi-fluid condition, for the purposes specified.**

The Smith Formula.

"I take any good **hydraulic cement, preferably Portland cement, and sand, gravel, or some equivalent of sand or gravel, such as broken shells, slag, etc., and mix them together in about** equal proportions by specific weight. This mixing may be accomplished by any suitable means, but preferably by the machine described in my other application above referred to.

"To the mixture of cement and sand, in the proportion of two parts, by weight, I add three parts, by weight, **of broken stone,** using therefor

any of the varieties of stone suitable for the purpose, such as blue-stone, quartz, the ordinary cobble-stones employed for paving purposes, granite, etc. I then add a quantity of water equal to about three-fifths of the entire mass of materials already commingled, and agitate the mixture thoroughly by mechanical means until the whole is of a fluid character, capable of **flowing freely through pipes** and of **being run into covered molds.** It is then ready for use."

The Smith formula (Exhibit 193) in short is:

1 part cement,

1 part sand,

3 parts broken stone,

Sufficient water to render flowable.

The standard tunnel mix such as used on the Duboce Tunnel in San Francisco where the Smith and Canniff tests were run (R. 466, Exhibit 194) is:

1 part cement,

2¼ parts sand,

4¾ parts rock,

Sufficient water being added to render flowable.

Samples of the Smith formula and of the present-day formula are in evidence as defendant's Exhibits 193 and 194 and are indistinguishable one from the other. When wet they were flowable, and when poured they settled to a practically level surface as is seen by the exhibits themselves.

THE APPARATUS IS PORTABLE.

Smith, in his patent 122,498, continuing, says:

> "In the first place, for the purpose of thoroughly **mixing the materials and conveying them in a fluid state** to the spot where they are to be laid, I employ a portable machine."

The pipes D are "Adjustable and Movable."

FORCING APPARATUS.

The patentee next points out the **object** and operation of his "Forcing Apparatus F."

> "The **liquid composition,** after it has been thoroughly mixed with the **pebbles, gravel or broken stone,** flows off from the mixer through passages **d,** provided with suitable valves, into the pipe **D,** which delivers it wherever it is required for use. When **it is necessary to force the liquid up hill,** or **to convey it quickly or in larger quantities than usual,** or **through long pipes, or** to press it in the mold and expel the air therein; in which it might begin to stiffen before reaching its destination; **I employ a forcing apparatus** to propel it through the pipes, the same consisting preferably, **of a tight chamber F, capable of resisting great pressure,** into which the liquid flows from the mixer, and a **pipe, f, by which steam or compressed air** can be introduced into the **chamber F,** upon the liquid, to force the latter, by pressure, into the pipe D. Any other species of forcing apparatus may, however, be substituted, if preferred."

SPECIFICALLY AND DEFINITELY DESIGNED FOR CONCRETE.

The patentee says:

> "The pipe D may be jointed or flexible, to adapt it to be lengthened or shortened, or moved in any desired direction.

"By reference to my application for Letters Patent upon the composition which I prefer to employ with this machine, it will be observed that the constituent elements of such composition are **cement, sand, water, and gravel, or broken stones.**"

SMITH, LIKE McMICHAEL CLAIMS BOTH APPARATUS AND PROCESS, THUS:

"Having thus described my invention, what I claim is:

"1. The process of laying **concrete pavements** by flowing the liquid material upon the bed of the street, substantially as described.

"2. The **compressing apparatus F,** in combination with the mixer, and the pipes or **conduits,** substantially as and for the purposes described."

Plaintiff makes a number of incorrect statements concerning this patent and its disclosures. Despite the fact that Smith calls for concrete, specifying a mixture of cement, sand, rock and water, "the properties of which are adapted to be conveyed while in a fluid state," plaintiff's counsel has the audacity to say (p. 43 of its brief) and to italicize it:

"*Smith was not handling the same material as McMichael.*"

Plaintiff's counsel attempts to justify this misstatement by saying in the next breath:

"The material which Smith handled, although called 'concrete' was in fact a very thin watery mixture which would flow through a tortuous passage *d* from the mixing hopper C to the air chamber F. * * * He (Smith) also says that the composition is '*sufficiently liquid* to settle to a perfectly *level surface.*'

> "It is clear that concrete to be used in tunnel linings, etc., as conveyed by the McMichael apparatus is not the same as the soupy fluid which was the only thing which the Smith apparatus could handle." (Italics by plaintiff.)

The samples, Exhibits 193 and 194, sufficiently answer plaintiff's contentions.

Manifestly, the plaintiff is brought to sore straights in pretending that the McMichael patent calls for and can be sustained on a certain degree of fluidity or consistency of the concrete.

Concrete is concrete just as "Pigs is pigs."

The plaintiff repeats over and over again (pp. 44-45-46 and p. 35) the misstatement that Smith calls for "liquid concrete."

Perhaps plaintiff is trying to bring the Smith formula within the definition of grout as given in New York Exhibit 111, viz., "Liquid Concrete." We fail to see how that helps plaintiff.

"Liquid" is simply opposed to "Solid" or to "Gaseous."

The definition in Standard Dictionary:

> "LIQUID, (n) 1. A body in that state in which the particles move freely among themselves, but remain in one mass, keeping the same volume, but taking always the form of the containing vessel; an inelastic fluid as opposed to an elastic fluid or gas. Compare fluid; gas; solid.
>
> " 'Mercury is a liquid, yet it is almost twice as dense as steel.
>
> J. D. Steele, Physics p. 26 (A. S. B. 1878).' "

Even if the exact degree of flowability of Smith's concrete were an issue, the truth is that the **Smith**

mix was practically the same mix used today in tunnel work!

The trial Court must have been impressed with the fact that plaintiff, although accorded every opportunity to view the tests, to examine the Smith gun in Court, to cross-examine the several witnesses testifying about the subject, chose to ask not one question nor offer one word in rebuttal, but apparently accepted the tests as conclusively demonstrating the operativeness of the Smith patent for performing all the functions for which it and McMichael were specificially designed. The testimony on Smith stands admitted.

Whether admitted or not, Smith utterly destroys the McMichael patent.

THE TESTS ON THE SMITH GUN.

It was to determine not only the practicability of the Smith apparatus for blowing present-day concrete but to ascertain what his patent taught, that these tests were run.

In the tests referred to, the Smith formula (Defendants' Exhibit 193) was used and also the present day formula (Defendants' Exhibit 194) was used. **The Smith mix was substantially the same mix as used today on tunnel work!**

HACKLEY ON THE SMITH TESTS.

Mr. Hackley, an engineer and practical concrete man, identifies the photographs Exhibits 184-5 and the Smith Machine Exhibit 186, and says (R. 429):

"They represent a machine built for the purpose of shooting concrete through a pipe. The discharge pipe is a four-inch pipe with a four-inch valve on it directly under this container. On top there is a two-inch and a quarter air connection. The air was let into the chamber under a 100-pound pressure. On the side was an opening for filling concrete or materials to be discharged from the pipe. We first filled that container with water and turned on the air and opened the valve at the bottom after plugging the inlets—the charging opened the valve at the bottom and the water was discharged through the pipe."

(R. 429):

"A. I might say that the end of that discharge pipe was about thirty feet from the machine and at an elevation of about twenty feet above it. After shooting the water out, we filled the container with concrete and shot that out in the same manner. We then used concrete—mixed concrete with rock up to an inch and a half in size of two different consistencies or two different mixtures and that was discharged in a continuous stream in the same way."

THE SMITH MIX AND THE PRESENT DAY MIX VARY BUT SLIGHTLY.

Continuing, Hackley said:

(R. 430):

"A. The first mixture by weight—one of cement and one of sand and three of rock. The second mixture, one of cement, two and a quarter of sand and about four and three-quarters of rock."

SET-UP AS NEAR PRESENT DAY WORKING CONDITIONS AS POSSIBLE.

Hackley testified:

(R. 431):

"You said that the pipe of that demonstration machine represented in the photographs 184 and 185, extended up about twenty feet in the air?

A. Yes, sir.

Q. Why was that?

A. Because that is the usual working condition that any concrete gun works in.

Q. How near do the working conditions in other respects correspond for the demonstration to present every-day working conditions?

A. Just practically the same as every-day working conditions as near as we could get them.

Q. In your opinion as an engineer, did they shoot the concrete successfully?

A. Yes, they shot the concrete successfully."

* * * * * * *

On cross-examination Hackley testified that **the opening of the bottom valve has the effect of McMichael's secondary air jet 12:**

(R. 437-438):

"Q. Didn't it flow out?

A. No, it didn't. It dropped out when we opened the valve. Yes, that started up the discharge.

Q. What do you mean by 'dropped'; didn't it flow?

A. When the trap was opened it started the discharge.

Q. Didn't it flow?

A. It acted the same as a jet of air.

Q. What did?

A. The opening of the valve.

Q. Do you mean to say that the opening of the valve acted the same as a jet of air?

A. Yes, underneath it. It started through the discharge pipe.

Q. That is, the gravity that caused that to drop down out of that tank, that was comparable to the action of an air jet?

A. It broke the bond right at the opening. It broke the surfacing of the concrete right at the discharge opening."

(R. 438):

"Q. You said that that concrete came out like a stream of water—in a solid stream?

A. I said it came out in a solid stream mixed with air."

(R. 439-440):

"Q. Then there was a discharge pipe which led from the bottom of that tank horizontally some distance, I presume, and then up about twenty feet?

A. Yes, that is correct.

Q. Then you applied air under pressure to the top of that tank there by an inch and a quarter pipe?

A. That is correct.

* * * * * * *

Q. Did you open the valve after the air pressure was turned on?

A. At approximately the same time.

* * * * * * *

Q. Now, did the pressure acting on the surface of that water force that water down through that pipe in a solid stream, filling the discharge pipe?

A. It mixed with the water as it went out. The air travels faster than the water.

* * * * * * *

A. In a solid stream mixed with the air."

* * * * * * *

(R. 440):

"Q. You operate in the same way with the water and the grout as you did with what you

called the concrete, didn't you?
A. Yes, sir."

PETERSON ON SMITH TESTS.

Mr. Peterson, an engineer of wide experience in this work, testified:

(R. 462):

"A. I was present at tests made at that portal of the Sunset (Duboce) Tunnel. * * * We tested a Smith type gun, 1872 patent, and a Canniff type gun.

* * * * * * *

Q. Well, we first tested the Smith gun with grout, and then we made up a mixture which corresponded as closely as we could determine to the original Smith mixture and then we put through a regular tunnel mix that was being used. We next put through a grout mix—put a grout mix through the Canniff type gun and then we put a grout mix with rocks and with sand—or I should say with cement and sand and rocks—the maximum size of rocks in the case of the Canniff gun being one inch. * * * The Canniff outlet was two inches. * * * The action was similar in using the different substances."

Concerning photographs (Exhibits 184-185) Peterson says:

(R. 463):

"A. * * * 184 shows the Smith gun as it was set up at the time of the test, and Exhibit 185 also shows the Smith gun and the complete discharge line as set up at the time of the test."

(**C** represents the air inlet pipe, **D** represents the hopper or inlet for the concrete.)

Continuing Peterson says:

(R. 464):

"A. Just before the test started I went up and read the gauge on the compressor showing that it was 103 pounds to the square inch. I then went down with a couple of men and attended to the mixing of the materials that were put in so that we would know what went into the gun. That was taken over to the gun. The plug in each instance was put on after the materials were inside. The air pressure was introduced at the top and when the full air pressure was on we opened the cock, opening the valve quickly and immediately the materials were discharged from the gun. I do not want to say immediately, but they were promptly discharged."

* * * * * * *

Smith action alike with either grout concrete or water (R. 464-465):

"Q. Tell us what materials you ran through the Smith gun under compressed air at that time?

A. We used first a grout of one part cement and two parts sand mixture. We then used the **Smith formula mix of one part cement and one part sand and three parts rock;** the parts being by weight, and then we did three shifts of the volume by water. That was the mix used as nearly as we could duplicate those conditions. * * * Well, we washed the machine first before we started, to be sure that there was no obstruction of any kind of that sort. As far as that goes, first of all we applied air through and then we applied water and then the grout and then the concrete mixture. * * *"

SMITE ENTIRELY PRACTICAL.

Peterson says (R. 465-466):

> "Q. Did those tests satisfy you as to the practicability or otherwise of the Smith gun as a gun to shoot concrete?
>
> A. Yes, sir. I would say—I would use it on a large job. I would make a bigger gun but just the same type. The principle was satisfactory. It showed that it had the proper structure or proper general proportions and features to shoot concrete. That was what we were interested in doing."

The Smith formula practically the same as for present day tunnel lining:

The witness identifies Exhibit 193 as a sample of the Smith patented formula for concrete and Exhibit 194 as a sample of regular present day tunnel mix used in the Duboce tunnel.

The Court can see that there is no distinguishable difference between the two. They have substantially the same ingredients, and they flattened out just like all concrete does when poured into molds.

The San Francisco tests with Smith demonstrated:

(1) That the Smith machine (Exhibit 186 and photo exhibits of same 184-185 would shoot **concrete** successfully and as it was **designed** and **intended to do** by the patentee.

(2) That the Smith machine would shoot concrete in a **continuous stream,** as seen by the moving film prints. (Exhibits 190, 191, 192.)

(3) That with Smith as with the more modern machines, there was **no difference in operation** wheth-

er shooting **water, grout** or **concrete,** except in the **color** of the discharge. (Note Exhibit 190 with water has a light colored discharge; Exhibit 191 with **grout** is a little darker; while Exhibit 192 with concrete is considerably darker.)

(4) The consistency of the Smith mix and of the present day mix is not materially different, as seen by the samples. (Exhibits 193 and 194.)

(5) **The Smith mix** and the **present day mix** have substantially the **same degree** of **fluidity** or **flowability.** Both necessarily have the Smith quality of being sufficiently liquid to settle to a level surface.

The Ninth Circuit Appellate Court said of Smith (27 Fed. (2d) 838, 839):

> "The specifications described the apparatus as specially adapted to the manufacture and convection of concrete composition through pipes so as to set quickly upon reaching its destination and form a solid mass of artificial stone, and **uncontradicted testimony** was given of the successful use of the Smith machine in conveying concrete through a pipe by compressed air. The device contained all the features of the appellant's patent except the nozzle for admission of air near the point of exit."

DUCKHAM'S PNEUMATIC MACHINE FOR CONVEYING DREDGE SPOIL.

If any point is made that Smith in his 1872 concrete gun did not disclose the secondary or syphon jet represented by the air pipe 11 of McMichael, we have only to turn to the work of the eminent English engi-

neer Duckham for a full and complete disclosure and an anticipation of everything in McMichael.

DEFENDANT'S EXHIBIT 29 RE DUCKHAM DREDGE.

The practical application of this invention at the famous Millwall Docks, London, is shown in the Engineering Publication Minutes of the proceedings of the Institution of Civil Engineers (1887) in evidence as **Defendant's Exhibit 29.**

This article and illustration, when taken with the Duckham patents, completely meets everything shown and described and claimed, as far as principle is concerned, in McMichael.

Mr. Duckham's own description of his apparatus in said Exhibit 29 is as follows:

> "Duckham's Pneumatic Dredger: Mr. F. E. Duckham, M. Inst. C. E., engineer to the Millwall Dock Co., has introduced a system of discharging the dredged material, which has been successfully adopted at the Millwall Docks and elsewhere. The material, after being dredged, is discharged into capacious cylindrical tanks on board the dredger, or on barges alongside. These tanks when full are closed by air-tight doors; air is then forced into them by means of special air-compressor engines, and the dredged material is discharged, either into the sea, or through long iron pipes onto the land. The apparatus used at the Millwall Docks consisted of an ordinary bucket-ladder dredger, 113 feet long, 27 feet beam, and 12 feet deep, with a loaded draught of 8 feet; and two cylindrical tanks were placed one on each side of the well, having a combined capacity of 240 cubic yards. The same engines were used for either propelling the vessel, dredging or working the

pneumatic cylinder; they were compound engines of 25 nominal HP.; and the pneumatic cylinder was 20 inches in diameter. The discharge pipe was 15 inches in diameter, and 150 yards long, the pneumatic pressure being about 15 lbs. per square inch. From experiments made with one of the first apparatus constructed on the above principle, **the Author found that, with clay or stiff mud, if the nozzles of the air-injection pipes were too small, the compressed air, instead of driving out the material, simply pierced holes through it, escaping through the discharge pipe, and carrying along with it all the liquid and thin material in the tanks. This defect was easily rectified by rearranging and increasing the size of the injection nozzles, and the apparatus now gives most satisfactory results.''** (Boldface ours.)

Duckham was a distinguished engineer, as seen by his numerous patents, not only on dredging, but on grain conveying.

That Mr. Duckham's 1875 patent was not a mere paper patent nor a mere prophet suggestion is evident from the interest that the Duckham invention created in the engineering world, so much so as to be a matter for discussion among a distinguished body of engineers, not only as seen from the excerpt above of Exhibit 29, but further from the following:

New York **Exhibit 30**: I. C. E. 1896: Duckham's Grain Appliances at the Millwall Docks.

New York **Exhibit 32**: Transactions of the Institution of Naval Architects, 1898, pages 127-131, Duckham's Pneumatic Machinery for Loading.

These articles and patents illustrate the extensive practical use of compressed air for loading and unloading ships.

In Exhibit 30, page 303, Duckham, speaking in 1896, refers to his early successful work in **pneumatic dredging** and says:

> "Some sixteen years ago the author designed a dredger for the Millwall Dock Company. It raises the spoil by an ordinary bucket-ladder, and deposits it into a pair of tanks on board, holding about 200 tons. When brought to its place of discharge, the tanks are closed with the exception of pipes for admitting compressed air, and outlet-pipes through which the mud is forced by the air on to land 200 yards distant. The discharge occupies about thirty minutes. The success of this process suggested the use of air for the improved discharging of grain-laden ships, and the author set himself to solve the problem of its efficient application."

DUCKHAM (BRITISH) 4,400 OF 1875. (EXHIBIT 157.)

"IMPROVEMENTS IN DISCHARGING MUD OR 'SPOIL' FROM DREDGERS AND OTHER VESSELS."

Duckham says (p. 1, line 8 of the provisional specification of his first patent):

> "My invention relates to an improved method of discharging the mud or 'spoil' raised by dredging from the dredgers or barge in which it is received and the invention consists in the employment for the purpose of **pneumatic pressure applied in the manner and by the means hereinafter described.**"

At page 3 of the Complete Specification he says:

> "My invention relates to an improved method of discharging from dredgers or barges the mud and 'spoil' raised from the bottoms of rivers, harbours, docks, canals, and other similar places, and the invention consists in the employment for the

purpose of **pneumatic pressure applied as hereafter described.**

"According to my invention the mud or 'spoil' is received from the dredging apparatus in a tank or tanks capable of being closed **air-tight.** These tanks are preferably in the hold of the dredger itself, or they may be in a separate barge, and when full the dredger or barge having been conveyed to a suitable position near the shore or otherwise the receiving apertures are closed and the tanks made air-tight with the exception of **an inlet or inlets for compressed air,** and an outlet or outlets for the mud or spoil. Compressed air is then admitted to the tank to expel the mud, which is conveyed by suitable pipes or hose to the shore or elsewhere."

Duckham chose the **horizontal** type of container. He says (page 4, line 4):

"I prefer to construct the tanks of a form favoring the flow of the mud or 'spoil' to the outlet, and in order to prevent a deposit of mud in the tank so thick that it would not run freely to the outlet and would therefore remain in the tank, I prefer to inject compressed air (with or without an admixture of water) supplied by force pump or other means through a number of nozzles at the bottom of the tank, said nozzles being pointed towards the outlet. By this means the particles are prevented from settling and are kept in suspension until the whole is expelled from the tank. Compressed air may moreover be admitted into the discharge pipe with the same object."

DISCHARGE THROUGH PIPES AS IN McMICHAEL.

Duckham further says (page 4, line 25):

"The apertures beneath the shoots having been closed by proper covers, there is attached to the outlet pipe E a discharge pipe or hose F **by which**

the mud is conveyed to the shore. If the mud is contained in two tanks the two outlets may unite in a single outlet pipe E, as shown, in which case sluice valves are provided in the branches at G so that should one tank be emptied before the other the outlet from such tank can be closed. H, Figure 1, is the pipe through which **air is forced into the tank by an air pump, I,** worked by the same engines that drive the buckets and the screw propeller; K. K. represents the engine cylinders."

And then follows the complete disclosure and anticipation of everything there is left in either the McMichael apparatus or process.

Duckham says (page 4, line 35):

"**In addition** to the **compressed air admitted at the upper part of the tank to press upon the surface of the mud for the purpose of expelling the same, compressed air may also be admitted through nozzles at the bottom of** the tank (with or without an admixture of water, as before mentioned) **to keep the mud agitated and prevent any thick deposit** in the tank. I may provide mechanical agitators or scrapers in the tank for the purpose."

"The invention may also be similarly employed for discharging mud from tanks not fitted in the dredger itself but in a separate barge, a suitable **air pump** operated by steam or other power being provided on board or on shore or a connection made with the tanks in the barge, and the **air pump on board another** barge or vessel."

"Having described the nature of my invention, and the manner of performing the same, I declare that what I claim as my invention to be protected by the hereinbefore in part recited Letters Patent, is **the application and employment of pneumatic pressure,** as herein described and il-

lustrated, for **discharging the mud or spoil raised by dredging from tanks, whether such pneumatic pressure be used alone or in combination with an injection of compressed air or of water through nozzles at the bottom of the tank,** or with **mechanical agitators or scrapers,** as set forth."

DUCKHAM.

BRITISH PATENT NO. 15,348, DECEMBER 14, 1885.

(EXHIBIT 158.)

In Duckham, 2nd patent, he says, page 1, line 7:

"In the apparatus herein described the mud or spoil was received directly from the dredging buckets in a tank or tanks whence it was expelled through outlet pipes by means of compressed air admitted at the upper part of the tank, assisted by compressed air and water injected at the bottom of the tank, to agitate the mud and prevent thick deposit."

(pp. 91 and 96-98 of its brief):

Plaintiff criticizes the Duckham patent for its failure to illustrate in the drawing the exact location of the air nozzles in the bottom of the Duckham tank.

Plaintiff's counsel nevertheless were quite able to interpret the Duckham description, for they said in their brief in the Court below (p. 35):

"It would seem, however, that what Duckham **had in mind,** but did not show, were some compressed air pipes located on the bottom of the tank and probably located at considerable distances from the discharge conduit. It must be remembered that these storage tanks employed by Duckham were enormous affairs. * * * What Duckham probably did was to put some air pipes on the bottom of his tank **many feet**

> **away from the discharge conduit** for the purpose of stirring up the mud and nothing else." (Boldface theirs.)

Just why plaintiff thought these ejector jets were "**many feet**" from the discharge is not clear. The rear jets of Hackley are "**many feet**" from the discharge conduit.

The answer to that is found, as we have already pointed out, in the patents themselves and in the interest created in the engineering field by Duckham's **practical success** with his apparatus.

As to the location of the air jets, note what Duckham says in his first patent (p. 4):

> "* * * I prefer to inject compressed air * * * through a number of nozzles at the bottom of the tank, **said nozzles being pointed towards the outlet * * * compressed air may moreover be admitted into the discharge pipe with the same object.**" (Boldface ours.)

That is pretty definite as to location and function.

Plaintiff chooses to ignore the historical statement contained in the publication (Exhibit 29) entitled "Engineering Publication Minutes of the Proceedings of the Institution of Civil Engineers (1887)," reprinted pages 185-188 Book of Exhibits.

Duckham himself, speaking as a distinguished engineer in charge of the great Millwall Docks, London, and describing this invention said in regard to the only air jets in question (p. 188, Book of Exhibits):

> "* * * the author found that, with clay or stiff mud, if the nozzles of the air-injection pipes were too small, the compressed air instead of

driving out the material, simply pierced holes through it, escaping through the discharge pipe, and carrying along with it all the liquid and thin material in the tanks. This defect was easily rectified by re-arranging and increasing the size of the injection nozzles, and the apparatus now gives most satisfactory results.' "

"SPOIL" ANALOGOUS TO CONCRETE.

Concerning the labored effort of plaintiff to disparage the Duckham and Hussey dredge operations, little further need be said.

In addition to the evidence, both documentary and otherwise, we have the testimony of Mr. Peterson in answer to the following direct question (R. 454):

> "Q. What material has about the same handling characteristics as concrete?
>
> A. I would say a sticky mud containing considerable clay, commonly called muck, would be quite similar with a moderate amount of moisture and the similarity would be even greater with the rock embedded in that, commonly called **spoil.**"

PERTINENCY OF DUCKHAM AND KOLSCHE RECOGNIZED BY JUDGE BOURQUIN.

Tersely summing up the prior art the Honorable Trial Judge said (R. 619-621):

> "Amongst many patents asserted to be anticipatory of the idea and use of the lower air, but three need be considered.
>
> "Of these, the first and second are **Duckham's English patents** 4,400 of 1875, and 15,348 of 1885. They are for apparatus and method to convey the

spoil or mud excavated in dredging. To that end are employed a container for the material, compressed air above or behind it to drive it down to and through the discharge pipe, and like air through several nozzles in the bottom and pointing towards the discharge pipe, 'to keep the mud agitated and prevent any thick deposit in the tank.'"

The Court of Appeals said of Duckham (R. 669):

"We think it indisputable that Duckham, in prescribing the use of pipes for the admission of compressed air in the tank, the same distributed along the bottom of the tank, and one of them locatable at the exit, presented the use of all that is included in the appellant's combination, save and except the U-bend, an exception which is negligible so far as the present litigation is concerned, and if there is distinction in the fact that Duckham used no air pressure above the contents of the tank, and thus omitted one of the features of the appellant's combination, that feature is also absent from the Hackley combination used by the appellee."

DUCKHAM ANTICIPATES McMICHAEL'S CLAIMS IN LETTER AND SPIRIT.

We have only to apply the disclosures of the 1875 Duckham patent to the claims of McMichael to show invalidity of each and every claim of McMichael on which the present suit is predicated.

(Plaintiff declared on the following claims (R. 10): 1-2-17-18-24-29-34-35.)

Take the following typical claims of McMichael and see how aptly they fit Duckham:

CLAIM 2:

In combination,

(1.) a chamber for containing concrete forming materials [or analogous material],

(2.) a conduit leading therefrom,

(3.) a compressed air inlet pipe,

(3a.) connected to a part of the chamber remote from the conduit,

(4.) and another compressed air inlet pipe leading through the chamber wall,

(4a.) and terminating within the chamber near the opening into the conduit in a nozzle directed toward said opening.

Claim 17:

In a device for treating and moving a mass of concrete forming material, the combination of

(1.) a chamber for receiving and containing the said mass,

(2.) a discharge duct connected with the chamber,

(3.) an air inlet pipe connected with the chamber,

(4.) means for preventing the flow of air or materials out of the chamber

(4a.) except through the discharge duct,

(5.) means for supplying air under pressure through the said pipe to the chamber

(5a.) back of the mass of materials therein to push the said mass toward and into the discharge duct, and

(6.) means for causing a jet of air to impinge upon successive portions of the mass

(6a.) in the general direction of the discharge duct to directly assist their movement therethrough.

CLAIM 24:

In a device for treating and moving a mass of concrete-forming materials, the combination of

(1.) a chamber (1) adapted to receive and contain the said mass,

(2.) a discharge duct (14) connected with the chamber

(2a.) and extending from it to a discharge point

(2b.) in a horizontal plane above the chamber,

(3.) and means (pipe 10) for directing a pressure agent into the discharge duct

(3a.) in the general direction thereof

(3b.) to engage sub-masses of the materials and aid their movement through the duct to the discharge point.

We believe that with the foregoing showing, defendant might rest their case.

THE CANNIFF MACHINE, PATENT NO. 873,345, DATED DECEMBER 10, 1907. (APPLICATION FILED OCTOBER 29, 1906.) (Exhibit 149, p. 543 Exh. Book.)

This Canniff invention is **prior art** both as respecting **prior invention** and **prior use**, to McMichael. Mc-

Michael filed January 14, 1907; Canniff filed October 26, 1906. A certified copy of the Canniff File Wripper was offered as Defendants' Exhibit 82 for identification; and by stipulation (R. 402) the date of filing of Canniff is admitted. **This establishes the Canniff invention at least as early as October 29, 1906, which was some months prior to McMichael's filing date.**

THE FIRST APPLICANT IS THE FIRST INVENTOR IN THE ABSENCE OF EVIDENCE TO THE CONTRARY.

This is settled law by the late decision of the Supreme Court in *Alexander Milburn Co. v. Davis-Bournonville,* 270 U. S. 390, 70 L. Ed. 651.

Canniff is for a machine for conveying grout or "liquid concrete" by compressed air.

CANNIFF A VERTICAL MACHINE LIKE McMICHAEL.

(See Model Exhibit 179.)

While the **shape** of the Canniff device is vertical, the patentee says this is unimportant (p. 1, line 60):

> "In the practical application of my invention the form or configuration of mixing chamber C is of secondary importance, and I do not limit myself in this respect, neither do I restrict myself to the identical arrangement of parts herein shown, since modifications thereof may be resorted to with like result.

COMPRESSED AIR ADMITTED ON TOP OF THE MATERIAL.

> "* * * b, is an air pipe extending to any suitable source of supply of air under pressure. This

compressed air pipe b enters a three-way valve b1, communicating through the pipe b2, with the upper part of the cylinder C and through the pipe b3, with the combined air inlet and grout discharge pipe a." (p. 1, line 90.)

"when the valve v, may be closed and the valve b1, reversed to shunt the compressed air into the top of the cylinder C, when the valve e, being opened, the grout is discharged by displacement by the pressure and accumulation of compressed air above it in the mixing chamber."

An early Canniff machine is in evidence as Defendants' Exhibit 179. It was produced during the testimony of the witness Mr. McCormick who was active with Mr. Canniff in the development of this machine prior to 1905. We have also the drawing of the early 1898 McCormick machine (Defendants' Exhibit 175) which preceded Canniff and bore much resemblance to the present-day Ransome-Canniff machines for shooting both grout and concrete.

THE RANSOME-CANNIFF CONCRETE GUN.

The Ransome Company, **licensees of the plaintiff, are also licensees under Canniff** (Robinson R. 123, 524, 571).

A modern exemplification of Canniff as a **concrete** gun is illustrated and described in the enlargement Defendants' Exhibit 210, duly identified on cross-examination of plaintiff's witness, Mr. Robinson (R. 572), of the Ransome Company (see New York Exhibit 95). This article alone, taken with **the fact that the Canniff patented grout gun is used commercially**

as a concrete gun, is sufficient in itself to prove invalidity of McMichael by the prior invention of Canniff and of McCormick.

The Ransome-Canniff machine, shown in the enlargement—Exhibit 210—and described in the publication "New York Exhibit 95," is practically identical with the Ransome concrete mixer and placer shown in the Ransome vertical machine illustrated on pages 89, 90 and 91 as plaintiff's Exhibits 16, 17-A and 17-B.

The Ransome Company later changed the name of the machine from Ransome-**Canniff** to "Ransome Pneumatic Mixer and Placer." (See said Exhibits 16, etc.)

The real reason, no doubt, **why the Ransome Company changed the name without changing the machine** and took a license under McMichael, was **because the Canniff patent expired December 10, 1924.** As far as known, it was about that time, or subsequently, that the Ransome Company took its license from McMichael so as to hoodwink the public by an extension of their patent monopoly; the life of a United States patent being seventeen years.

THE McCORMICK 1898 MACHINE AS PREDECESSOR OF CANNIFF.

For the history of the Canniff invention we have, in addition to the patent itself, the testimony of Mr. Thos. J. McCormick, of Detroit, Michigan, a witness at the trial, who has had perhaps a wider experience

than any other single individual in the use of cementing tunnels in the New York and Boston Subways. Mr. McCormick testified as to the long, extensive and continuous use of the Canniff machine.

In 1898 Mr. McCormick had his first experience in the use of compressed air for the transportation of materials such as cement and concrete, at which time he built a machine, the drawing of which is in evidence as Defendants' Exhibit 175 (p. 681 Exhibit Book) for grouting tunnels by compressed air.

The McCormick machine consisted of a closed receptacle, into which the grout or "liquid concrete" was placed. The air was admitted to the pipe at the left and bottom, and the material in the receptacle was ejected just as it would be by McMichael's ejector 12.

This machine was used on various work in connection with the East Boston Tunnel in 1902-1903 (R. 405) and the Belmont Tunnel in New York in 1905-1906. A very large quantity of grout was placed with this machine, which, after a few years' use, was discarded and junked. **It was the immediate ancestor of the Canniff machine shown in the Canniff patent above mentioned.**

Canniff was master mechanic under Mr. McCormick in the construction of the Belmont Tunnel.

Mr. McCormick says he first saw one of these Canniff machines in operation in 1905 in the Belmont Tunnel (R. 407). An early Canniff machine, having a shipping weight of some six hundred or seven hundred pounds, is in evidence as Defendants' Exhibit 179 (R. 412).

This particular machine is one that witness found in New York at the time he gave his deposition in June, 1927, in connection with the suit of this same plaintiff versus Great Western Power Company, known as the San Francisco suit and since dismissed by the plaintiff. This particular machine (Exhibit 179) was actually made about 1908 or 1909, and as far as witness knows it is the oldest Canniff machine in existence today (R. 412). Witness identified this machine as the same as the Canniff machines he had first used in 1905.

Continuing Mr. McCormick testified (R. 410):

"Q. Now, how did that Ransome Canniff concrete gun compare with or differ from, if it did, the Canniff grout gun showin in the patent?

A. Practically the same, only on a larger scale. There was a larger discharge and a larger cylinder.

Q. In your opinion as an engineer, is there any difference in operation between the conveying of concrete and the conveying of grout by compressed air?

A. Practically none."

* * * * * * *

And (R. 419-420):

"Q. Mr. McCormick, from your experience in handling the work of concrete, and so forth, is this machine, illustrated in Defendants' Exhibit 176 for identification, applicable to the transportation of concrete?

A. Yes, sir.

Q. By means of compressed air?

A. Yes, sir.

Q. In the manner that you have already described?

A. Yes, sir."

Plaintiff's engineer Robinson admits that Canniff machine in evidence as Exhibit 179 "looks like a McMichael machine."

Robinson says:

(R. 525):

> "A. The machine that I have just examined in the basement, it has the plug over on this side where we have the discharge—where we have the discharge there is a plug in there and evidently their discharge is where we have a plug. In other words, as rigged up, to me it looks like a McMichael machine instead of a Canniff machine.
> * * * * * * *
>
> A. Its operations are like the McMichael machine. The way I understand that they have it piped up its operation is like the McMichael machine rather than the Canniff machine. In other words, they have the plug line where we have the discharge line and they have a discharge line in where we have a plug in.
>
> The COURT. Well, does that mean that the blow is on one side of the machine is your case and on the other side, in the other case?
>
> The WITNESS. May I explain it to you?
>
> The COURT. Yes.
>
> A. Here is our discharge line here (indicating) and this is the plug up here (indicating). The plug down in the basement is over here (indicating) and the discharge is over there (indicating).
>
> The COURT. Simply a reversal of the direction of the operation, is that all, or are there any other differences?
>
> A. Reversal in the direction of the operation, yes, sir."

Such mere reversal of fluid flow does not create invention, nor avoid anticipation, as the Court so readily saw.

Plaintiff dismisses the Canniff patent and use in one paragraph (p. 25) but in which these significant sentences occur:

> "*The Canniff patent* No. 873,345 shows another device for handling fluid grout. Canniff developed a device which was a very successful *grout* mixer and conveyor and which is being used by the Ransome Company and others to the present day. It is generally recognized as an excellent grouting machine. But Canniff never contemplated that it should be used for handling concrete. It is not adapted for handling concrete. and has never been practically used for that purpose."

It is not true as plaintiff knows, that Canniff "is not adapted for handling concrete and has never been practically used for that purpose."

THE CANNIFF MACHINE (EXHIBIT 179) IS A STANDARD CANNIFF MACHINE BUILT AS LONG AGO AS 1908 OR 1909.

CANNIFF INTERCHANGEABLE AS A GROUT GUN AND AS A CONCRETE GUN.

In 1916 and 1917 the Ransome Company built a concrete machine according to the Canniff patent and at first called it the "Ransome-Canniff" and later the "Ransome Pneumatic Mixer and Placer" (R. 529, 572: See enlargement, Exhibit 210 from N. Y. Exhibit 95). This exhibit from "Compressed Air," July 1917, (pages 8464-8465), is descriptive of the Ransome-Canniff pneumatic mixer and placer and illustrates the ready and obvious adaption of the Canniff grout gun to the handling of concrete.

It is noteworthy in this Ransome adaption of Canniff and McMichael the Canniff structure has been followed closely, particularly in the use of the syphon or velocity jet outside the concrete container. All that seems to have been borrowed from McMichael was the idea that concrete as well as grout could readily be used in Canniff.

ENLARGEMENT EXHIBIT NO. 210.

Unquestionably the Ransome-Canniff adaption to concrete illustrated and described in enlargement Exhibit 210, was only this reversal, so readily appreciated by the trial Court for Mr. Robinson tells us: (R. 529):

"We called it the Ransome Canniff for a while, and we called it the Ransome Pneumatic Mixer and Placer.

* * * * * * *

Q. Now, does this machine have its air jet arranged as disclosed in the Canniff patent or as disclosed in the McMichael patent?

A. As in the McMichael patent, directly opposite from the Canniff patent."

SAN FRANCISCO TESTS OF CANNIFF FOR CONCRETE.

Mr. Hackley testified (R. 426):

"Q. Are you familiar with the Canniff gun that we have been talking about here in evidence?

A. I am.

Q. Have you ever used one?

A. I have used the same type—the exact copy of it.

Q. Have you ever used a machine such as is illustrated here, Defendant's Exhibit 176?

A. I have—a single machine.

* * * * * * *

Q. In your opinion is the machine shown here on Defendant's Exhibit 176 adapted to blowing concrete?

A. Yes, that will blow concrete.

Q. Have you ever blown concrete with a gun similar to this?

A. I have."

ANY GROUT GUN IS ADAPTED FOR CONCRETE JUST AS ANY CONCRETE GUN IS ADAPTED TO HANDLE GROUT.

The Hackley gun is used for grouting; see photographs of Exhibits 181-182, reproduced pages 683-4 Book of Exhibits, and concerning which Mr. Peterson testified (R. 459):

"Q. Have you ever known of the Hackley gun being used for conveying anything but concrete?

A. Yes, sir.

Q. What material?

A. Grout.

Q. And where was that done?

A. That was done on head three tunnel and head four tunnel of the Pacific Gas & Electric Company and the Maloneys tunnel of the Pacific Gas & Electric Co.

Q. Did you see the Hackley gun blow grout?

A. Yes, sir."

* * * * * * *

(R. 459-460):

"A. Well, the concrete gun has—we used there a six or seven inch pipe which was not convenient to grout with. We used grout with a hose of about two or three inches in diameter and so we simply put a plate on the end of the gun and the nipple welded in that plate for convenient con-

nection of the hose line, and used it as a grout gun."

He identifies the pictures and says (R. 460):

"A. They represent the Hackley gun as used in grouting work at Pit Four Tunnel.

Q. Is that used ordinarily in the ordinary course of practice?

A. Yes, sir, where we use the concrete guns for grouting, especially in lava formations where large volumes of grout are required.

Q. Do the pictures show the reducer for the grout?

A. Yes, sir. In the first picture we have the reducer attached to the gun."

Conversely, the Canniff gun is readily adaptable to shooting concrete and in the San Francisco tests actually did shoot concrete.

Peterson says (R. 460-461) concerning the Canniff gun of enlargement Exhibit 176 and the Canniff gun under the San Francisco tests of September 7, 1927 (Exhibit 183, p. 685 Book of Exhibits; R. 460-461):

"Q. I show you an enlargement marked Defendant's Exhibit 166 for identification. Tell us if you know anything about that?

A. This is a grout gun which I used in general grouting work. One of the several different types of machines. I happen to know that it is the Canniff type grout gun, double cylinder conveyor and it is so arranged that grout can be put in one cylinder while the other is being discharged and it permits a fairly continuous operation.

* * * * * * *

Q. Is the apparatus of that drawing, Exhibit 176 for identification applicable to or not applicable to the conveying of concrete?

A. It is applicable to the conveying of concrete, yes, sir.

Q. Have you ever seen a machine like that blowing concrete?
A. Yes, sir."

Concerning the San Francisco tests with the Canniff gun Mr. Peterson has already been quoted.

Canniff with the usual two-inch discharge pipe and with air only on top of the material, just as in the Canniff patent, worked successfully to blow concrete when the stones did not exceed one inch in diameter. Naturally if you had a larger discharge pipe so the stones would not clog you could use stones of relatively larger diameters.

Mr. Peterson said, just as did all the other witnesses, that the action was similar whatever the substance or material used, whether concrete, grout or water. It is all a mere matter of degree anyhow.

Thus we see again how different in regard to the history of the Canniff invention and its capabilities the record is in the present *Storrie* case from that in the New York suits.

The same fact is true in regard to the next patent which we will consider.

McILVRID PATENT NO. 958,421, MAY 17, 1910. APPLICATION FILED NOV. 2, 1905. GROUT MIXER. (Defendants' Exhibit 151; N. Y. Exhibit 97, p. 559 Bk. of Exhibits.) ASSIGNED TO COCKBURN BARROW & MACHINE CO., JERSEY CITY, N. J.

This is the so-called Cockburn Barrow Machine.

Although the application was filed a year before Canniff, it was delayed in the Patent Office for one cause or another till 1910.

The patentee says (p. 1 line 76):

"The operation of the machine described is as follows: The materials, usually consisting of cement, finely crushed stone, sand and water, are introduced into the cylinder through opening 18, the door 22 being opened downwardly by gravity.

"The door 22 is closed and motive fluid, preferably compressed air at about 80 pounds pressure is admitted to the cylinder through pipe 13; the outlet pipe 16 is opened and the hose 17 held the work to which the grout is to be applied. The pressure of the air within the cylinder holds the door 22 to its seat, the rubber gasket 21 effectively sealing the opening."

THE McILVRID MACHINE.

This is a horizontal grout gun and defendant's machine is a horizontal gun; while Canniff, like McMichael, is a vertical gun.

The McIlvrid patented machine is shown to have gone into extensive commercial use as early as the year **1904** and is in wide use today.

Mr. Jas. McIlvrid, son of the inventor (now deceased) testified in the New York depositions (R. 329-337).

(R. 329):

"Age sixty-one, residence 42 Armstrong Avenue, Jersey City, occupation master mechanic."

(R. 329-30):

"Q. Are you familiar with drawings of the machine?

A. Yes, sir.

Q. You have used them a great deal?

A. Yes, sir, all my life."

He first went with the Cockburn Barrow & Machine Co. of New Jersey in 1906 when they were manufacturing the McIlvrid machine (R. 330) first as foreman, later as superintendent. During the 12 years he was there and until it went out of business about 150 to 200 machines were built (R. 331).

He identifies 1905 catalog C. (Exhibits 100-a and 100-b) of the Cockburn Co.

THEY BUILT ONE WITH A LARGER DISCHARGE FOR CONVEYING CONCRETE.

At (R. 333) McIlvrid testifies:

> "There was only the standard grout mixer manufactured but we afterward built the larger one with the larger discharge."

Mr. H. C. Leporte, a mechanical engineer, at present with the Union Iron Works of Hoboken, New Jersey, testifies (R. 337-356) that he went to work for the Cockburn Barrow Co. in 1903 (R. 337); that in January, 1904, he drew the designs for the McIlvrid machine (copies of the original drawings of January, 1904, and February, 1904, being in evidence as Defendants' New York Exhibits 98 and 99, p. 58).

He says (R. 338):

> "I was handed by Mr. McIlvrid, who was manager at the time, some rough penciled sketches showing the idea, and in a sketchy way the construction desired, and told to put in shape for construction.
>
> * * * * * * *
>
> "After one or two had been constructed and we found the construction and operation satisfactory enough, we made detailed drawings."

He describes the machines as follows (R. 338-39):

> "The machine consisted essentially of a steel plate cylinder—steel plate horizontal cylinder—with a shaft running through the cylinder longitudinally carrying paddles for the mixing of the material. The shaft passing through stuffing boxes on the heads of the machine to prevent air leakage. There was a dome mounted on the top of the cylinder and an opening in the top of the dome for filling the machine. When it was desired to eject the material from the machine, the door in the top of the charging dome was closed, then compressed air admitted to the cylinder through a pipe opening close to the top of the cylinder. This air pressure forces the door of the charging dome against its seat, giving a tight seal against leakage of air. The air pressure acting on the surface of the material in the cylinder forced the material out through the discharge pipe which entered the cylinder at the bottom—at the bottom of one of the heads—and forced the material to the right location through a hose connected with this outlet pipe just mentioned."

He identifies the machine illustration in the Cockburn Co.'s catalog C (1906), Exhibit 100-a—100-b at page 16 of the catalog.

Mr. Crooks, a subway construction engineer, in his New York deposition (R. 356) testifies to his early use of the McIlvrid machines. He also gives an interesting example of the impelling force of air under compression in actually **blowing a man through the roof of the Pennsylvania Tunnel under the Hudson River and up through twelve feet of muck and twelve feet of water!**

McCormick also used the McIlvrid machine and its British predecessor the Greathead (R. 408) prior to

McMichael, and where the grout or "liquid concrete" was blown out by air pressure on top of the mass, just as by McMichael's top air jet 8.

With these two forms of air jets (pressure jet and ejector jet) so well known, where could there be any possible invention in McMichael using **both** jets in **one** apparatus? Particularly would this absence of invention in McMichael be emphasized where both jets had already been repeatedly combined for identical use and purpose with McMichael (i. e., one jet applying pressure on the mass and the other acting as a booster jet to prevent arching or clogging) as in Duckham (Exhibit 157); (Sickles Exhibit 159), Rix (Exhibit 160), Kolsche (Exhibit 168) (see enlargement), Butler (Exhibit 167). The same principle was exemplified in Harris (Exhibits 164-165).

A MERE MATTER OF DEGREE.

A McILVRID MACHINE WAS BUILT TO HANDLE CONCRETE BY SIMPLY MAKING THE OUTLET PIPE LARGER.

Mr. Le Porte testified (R. 345-6):

"By Mr. Hilliard:

Q. Now referring to this Cockburn Barrow Machine Company catalogue 'C' which is defendant's Exhibit No. 100-B, do you know whether or not the machine shown on page 16 was ever built for mixing and ejecting anything besides grout?

A. **(Witness examines catalogue 'C'). We at one time made on special order one of those machines, standard size and construction, except that the grout outlet pipe was a larger size to permit the passage of stones, the user using it**

for ejecting concrete instead of grout mixture which the machine was designed for.

By Mr. Cox: 3

Objected to as largely incompetent and mere hearsay.

By Mr. Hilliard:

Q. You know that that machine was actually built of your own knowledge?

A. It was.

Q. You saw it made?

A. I did.

Q. Do you recall what the size of the outlet on that machine was?

A. It was either 2½ or 3 inch pipe size.

Q. Was that same order for this special machine ever duplicated?

A. **Not duplicated, but we received a successive order for a machine of exactly the same type and construction in somewhat larger size from the same customer."**

Here is a clear corroboration of all of defendants' witnesses that there is no difference in principle in blowing concrete from blowing grout. All you have to do is to make your conveying pipes larger for concrete than for grout.

For further examples of prior publications on pertinent art and as giving a brief resumè of the more striking examples from the voluminous bibliography on the subject of conveying by compressed air, the Court's attention is directed to the appendix to this brief.

NON-INFRINGEMENT.

Even if the McMichael patent was valid there is no infringement.

As we have already pointed out, the Courts in the Ninth Circuit found as a fact that whatever the **theory** was of the McMichael patent, the Hackley gun was not an infringement.

Not a single witness, anywhere, has ascribed to the Hackley gun the mode of operation claimed for McMichael. On their own theory of infringement plaintiff has failed to make out even a prima facie case.

On this branch of the case Judge Bourquin said (R. 614):

> "The charge of infringement against defendants is predicated upon their use of Hackley's apparatus, patent 1619297 of 1927. This latter is an oblong container, ovoid in cross-section, without upper air pipes, but having four lower air pipes. The discharge pipe is at the bottom and one end, and the disposition of the lower air pipes is entrance at the bottom, pointing towards the discharge pipe, one opening into the entrance of the latter, one opening into the opposite end of the container, and between them, open the other two and equalizing the distances between all of them in order. In operation the container filled, the air is first admitted through the pipe opening in the entrance to the discharge pipe, and thereafter through the others progressively, to the rear as the concrete subsiding in front of them is driven out through the discharge pipe."

Inasmuch as plaintiff emphasizes throughout its brief that the essence of the McMichael patent claims (if valid for any reason) is the use of **one** air pressure on top of the concrete and a secondary air jet in or adjacent to the concrete outlet, and further insists that McMichael, by virtue of the independent action

of these two jets, works on a "slug" principle, it is quite manifest that by the plaintiff's yard-stick, the defendants' apparatus works on a radically different principle from McMichael and, therefore, there could not possibly be any infringement.

Infringement, of course, is never presumed.

The burden of proof of infringement as well as novelty is upon plaintiff.

Mitchell v. Tilghman, 86 U. S. 287; 22 L. Ed. 125;

Price v. Kelly, 154 U. S. 669; 26 L. Ed. 634;

Seymour v. Osborne, 78 U. S. 516; 26 L. Ed. 33.

Proof of infringement must be beyond a reasonable doubt. The nature and exactness of this proof has been well expressed by the Circuit Court of Appeals for the Third Circuit in *Krupp v. Midvale,* 191 Fed. 588, 591.

DEFENDANTS' PATENT RAISES A PRESUMPTION NOT ONLY OF PATENTABLE AND, THEREFORE, SUBSTANTIAL MECHANICAL DIFFERENCE BUT OF NON-INFRINGEMENT.

Corning v. Burden, 15 How. 252, 14 L. Ed. 683;

Boyd v. Janesville Hay Tool Co., 158 U. S. 261, 39 L. Ed. 973;

Kokomo Fence Co. v. Kitselman, 189 U. S. 47 Law. Ed. 689.

A defendant's patent is admitted in evidence for two purposes:

(1) To show the good faith of the defendant;

(2) To show that the expert Examiners in the Patent Office regarded the invention which it covers as essentially distinct from that protected in the earlier patent of plaintiff (III Robinson 306, 307).

Hackley's machine, in fact, bears a much closer resemblance both in appearance and operation to the **Duckham British** patent No. 4400 of 1875, Exhibit 157 (see enlargement), than it does to McMichael.

Judge Bourquin on plaintiff's own grounds finds non-infringement (R. 621):

> "That serves to dispose of the case, and the defense of non-infringement needs no more consideration than to note that Hackley's apparatus is a different combination than McMichael's, has no upright cylindrical hopper bottomed container, is without the U bend, employs no upper air save some incidental back pressure, does not discharge slug fashion as claimed is the invention of McMichael, and so **does not infringe.**"

INVALIDITY OF McMICHAEL CONCLUSIVE.

We submit it is impossible to see any inventive thought in either conception or embodiment of the idea of conveying a fluid, or semi-fluid, plastic substance, like concrete, by compressed air.

We are confident that the teaching of the McMichael patent added nothing to the sum of human knowledge as it existed at the time of McMichael's alleged invention. It was as obvious then as now. Whether one substance or another was to be conveyed by a blast of air was for each individual operator to decide. No inventive thought could be involved in deciding such a question.

If we suppose that everything under the sun, except concrete, had been conveyed by compressed air prior to McMichael, could it be thought that the one who had first decided to try conveying concrete, was an inventor, particularly without any needed change of apparatus or mode of operation over transporting other substances and articles by that method?

And when it appears, as the evidence shows, that concrete itself had been conveyed through pipes and by air pressure, where could there possibly be invention in McMichael?

The case might be different if McMichael had been the first to observe and to realize any new or different mode of operation of concrete over other substance, and had designed new apparatus to fit such new and different mode of operation.

But the only observation he made and the discovery he sets up and was accepted by the New York Courts as a basis for his invention, is an alleged slug action or division of the concrete made into defined sections, each section propelled by an intermediate column of air, as distinguished from conveying dry materials.

But when it is seen that this so-called "slug" or "piston" action was not original with McMichael but was **one of two theories of operation in every air-lift apparatus** prior to McMichael it instantly becomes apparent that the McMichael claim for invention cannot rest on anything so unsubstantial, not to say tenuous.

But as this Court said in *Loom Company v. Higgins*, 105 U. S. 580, in pointing out that an inventor

describing his invention is supposed to begin where the prior art left off:

> "That which is common and well known is as if it were written out in the patent and delineated in the drawings."

SUBSTANTIAL IDENTITY OF RESULT DESIRED TO BE ACCOMPLISHED BY McMICHAEL AND OF RESULTS ACCOMPLISHED IN THE PRIOR ART.

What result did McMichael accomplish that was not already accomplished in the prior art?

Smith in his 1872 patent, patented the very thing, apparatus as well as method, that McMichael 35 years later sought to patent, viz., conveying **concrete by compressed air.**

Smith operated on the **same object** or **material,** for the **same purpose** and with the **same means.** In Smith we have complete anticipation. That being so, what was there left for McMichael to invent after Smith? The answer is absolutely nothing; unless it be his useless U-trap 24 which the practical witnesses on the stand all tell us would, if attempted to be used, render the McMichael apparatus inoperative.

The Patent Office did not cite Smith. Quite obviously they overlooked it. It is so much more pertinent than the art that the Patent Office did cite that we may rest assured they would have cited it if their attention had been called to it and the McMichael patent would never have issued.

Whatever the reason was, this failure to cite Smith correspondingly lessens any presumption in favor of validity that might otherwise attach to McMichael.

Westinghouse v. Toledo Co., 172 Fed. 371 (6 C. C. A.).

Aside from the Smith Concrete Gun, what difference is there in the material intended to be conveyed by McMichael from the Dredge spoils of Duckham or Hussey, or the excavated materials in caisson work, in so far as the fluid constituency, weight, etc., are concerned? It would seem to be that in the old cases it was a mixture of rock, sand, mud and water, while in McMichael it was a mixture of rock, sand, cementitious mud and water. Plaintiff's engineer, Kirkland, on the stand (R. 118) admitted that the addition of **cement** had a **lubricating** effect! Add **cement** to Duckham's or Hussey's material and we would have a concrete gun on such a scale as utterly to dwarf McMichael's efforts.

The McMichael patent has merely a nuisance value to further the speculative schemes of its owners as a means of demanding and collecting tribute by threatening, harassing and hampering legitimate enterprises. It is time the patent was shown up in its true colors and held void.

CONCLUSIONS.

(1) The McMichael patent is void for lack of novelty and invention over Duckham, Kolsche, Canniff, or McIlvrid, or the McCormick use.

(2) It is void for anticipation by Smith (1872); or Sickles (1870); or Kolsche; or Duckham (1875); or Hussey Dredge patents and use.

(3) It is void for prior invention by Leake.

(4) It is void for prior invention by Buzzell & Larkin.

(5) In any event defendant does not infringe because the Hackley patented gun does not use the construction and arrangement of McMichael but works according to plaintiff's own contentions on a different principle and with a different mode of operation.

(6) If the novelty of McMichael depends on the "slug" arrangement, then defendant does not infringe because Hackley does not use that method; and if that distinction is inevitable to plaintiff's patent, the methods of the prior art inevitably have it and the patent is void; in which connection the words of this Honorable Court in *Foley v. United States*, 260 U. S. 667; 67 L. Ed. 451, 455-456, are apt:

> "We need only to say that Gathmann emphasized the distinction of his patents from all that preceded them as using a 'vaporous or vapor-laden atmosphere,' and that such necessarily existed or will occur in the methods used by the government.
>
> "It is counsel's contention that it is 'inevitable that vaporous and vapor-laden atmosphere would be created the instant the heated air came in contact with the green powder, and would continue vaporous and vapor-laden until all of the alcohol and ether were extracted from the powder, or the powder be removed from the drier.' And of this, it is asserted, this court takes judicial notice as 'the law of physics;' and the further

assertion is that: 'Of course, this contract of the heated air with the alcohol and ether caused the air to become vapor laden, whether the defendant wished it or not.' The assertions prove too much. They leave the patents without basis, and the distinction they express and dwell on as merely verbal. If the asserted result was inevitable in the method of the patents, it was inevitable in the method in use prior to the patents; and, we repeat, the patents are left without justification.

"The conclusion, therefore, must be that if the methods of the patents are different from the prior art by reason of the 'initial vapor-laden atmosphere by admitting vapor as steam,' the government does not use it; if that be not its distinction, and the methods of the prior art inevitably have it, the patents are no advance upon that art and are invalid."

San Francisco, California,
February 28, 1929.

Respectfully submitted,

CHAS. E. TOWNSEND,

Attorney for Defendants-Respondents.

(Appendix Follows.)